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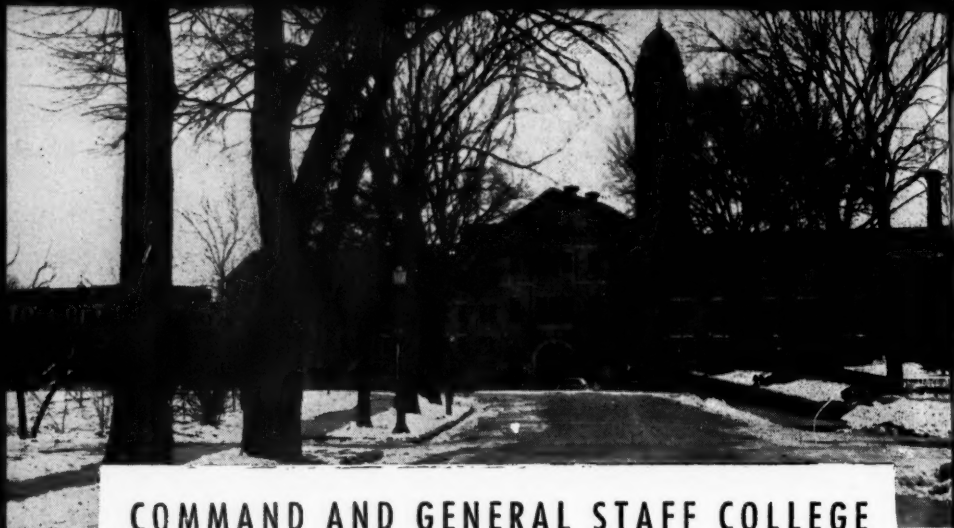
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Strategic Air Command

General George C. Kenney,
Commanding General, Strategic Air Command

IN the skies of America's great Southwest, the pattern for this nation's concept of long-range strategic air power is taking shape today. It is a new design in high speed flexibility; in a fresh, air-wise interpretation of warfare's oldest rule; he who "gets there fustest with the mostest," is he who wins the battles.

As this nation's first line of defense gears itself into the coming era of transonic and supersonic speeds, the long range units of Strategic Air Command are keeping pace with the unbelievable developments of the era already at hand. At Tucson, Arizona; Fort Worth, Texas; Tampa, Florida; Roswell, New Mexico; Salina, Kansas; Selfridge Field, Michigan; Manchester, New Hampshire; Rapid City, South Dakota; and in Alaska—all over this country—our very heavy bombers and escort fighters are engaged in the most intensive training in the history of the Air Forces.

Their program is a far cry from the haphazard plan we knew as preparation and training following World War I. Then, the nearest airdrome was the point for which you aimed. Then, a cross-country flight of a thousand miles had all the earmarks of an heroic operation. Today we are not only continuously engaged in flights of 3,000 or more miles as a routine training procedure, but, as I write this, bombers from our air forces are on routine training flights to Europe, to Japan, to Alaska, to the Caribbean.

That program will be continued and it will be intensified. The farthest boundaries of American operations abroad will be regarded by us as simply other air bases which we can use in our broad program of orientation, indoctrination and coordinated operations.

In a nutshell, Strategic Air Command is striving for three fundamental points as the basis for its operating policy:

1. The concept of all-weather missions, not as infrequent test flights, but as day-to-day operations.

2. The concept of absolute and continuing flexibility of every element, men and airplanes and matériel, in every operating unit.

3. The concept that oceans and land masses are no longer obstacles; that we are as surely a weapon of global policy as any other component of national defense.

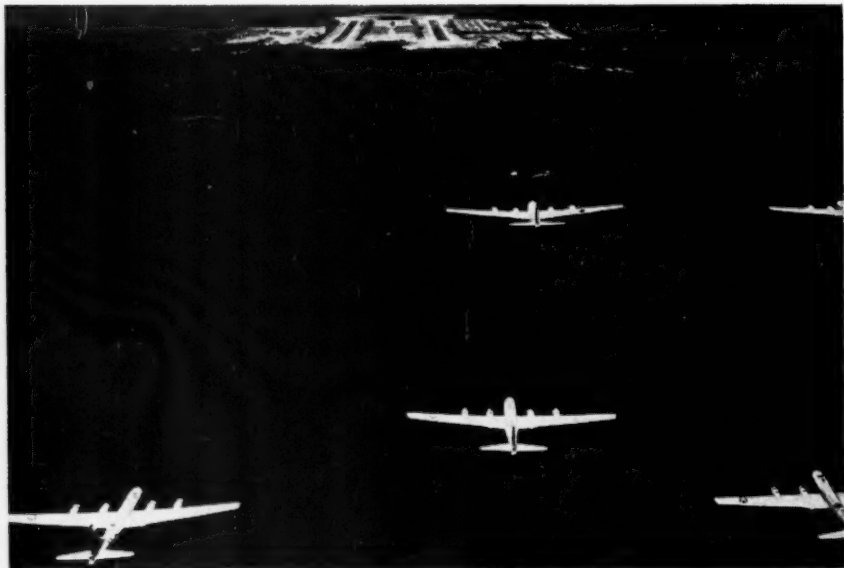
Let me elaborate on that policy as we are effecting it today in all units under the control of Strategic Air Command.

For twenty years, the development and advancement of airpower has been forcibly attuned to the manifestations of weather. Cloudy skies meant poor bombing. Low overcast meant closed airdromes. Snow storms meant no take-offs. That era, I am happy to report, is gone forever. Never again will weather halt, slow or even interfere with the success of any bombardment mission undertaken by this command. To keep our airplanes flying, we have literally

demand "all weather" policy and practice from our pilots. They are delivering and delivering well.

GCA—Ground Control Approach—guarantees us landings and take-offs under the most adverse weather conditions. So-called "home airdrome" difficulties are no more. Science has stepped in to make what was

missions return because of "severe weather" or aircraft-shaking thunderheads. No longer will airplanes be wracked apart by the terrible power of nature's elements aloft. With our air-borne radar we see the storms miles ahead and determine its intensity and centers. By early course changes, by full knowledge of the depth



B-29s returning from Tokyo in sight of North Field, Guam. (AAF photo.)

impossible yesterday not only possible but safe today. Andrews Field, Maryland, and Fort Worth, Texas, were the first two of our bases to adopt the GCA procedure as standard for flying operations. Strategic Air Command aircraft fly today when other aircraft are grounded in the Washington-Fort Worth area on account of weather. We have only begun full-scale operations on the immense potential offered by GCA.

We are constantly perfecting our air-borne radar. No longer will our bomber

and width of the storm, we can correct courses to get us to the assigned targets and to get us there safely.

Finally, we have our radar bombing: a technique rapidly becoming so nearly perfect as to challenge the capabilities of the most skilled bombardier's eyes and the most perfectly operated bomb sight. In recent mock raids against American cities, as in our military attacks against Japan and Germany, the theory of "blind bombing" continues to prove its indisputable merits. The low and high "scud" which

once negated bombardment results, the rain squalls and mists which once made it virtually fruitless to drop at all; yes, even the old emergency method of bombing by watch-navigation time coordinates when weather obscured the target are all things of the past. Radar bombing is here to stay.

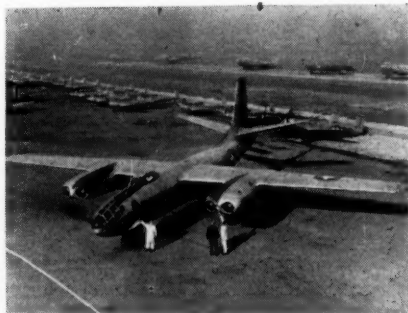
A milestone of inestimable importance in the overall scheme of global air operations has been successfully passed. Adaptable as airpower proved to be in time of war, the freedom of development allowed by peace has given us the opportunity to extend to an amazing degree the flexibility and mobility of our airpower. Day after day, the tremendous strides taken in the field of mobility are freshly accentuated. The future is limitless; the present but a small preview of the possibilities we see lying over the horizon.

Our new concept of flexibility was recently tested with units of the U.S. 8th Air Force stationed at Fort Worth, Texas. One Saturday several weeks ago, completely without warning, eight Superforts of the Fort Worth group were ordered to Panama. They were to report to the Commanding General, Caribbean Air Command, less than twenty-four hours later, *prepared to conduct combat operations*. At dawn on Sunday, the Superforts were at Albrook Field, Panama. They were loaded with gasoline and practice bombs. Full maintenance had been completed. They had traveled something over 2,000 miles.

Here is how it was done: the unsuspected field order had been sent to Brigadier General Roger Ramey, commanding the 8th Air Force, during Saturday morning. Simultaneously, field orders were dispatched to the Commanding General, Air Transport Command, and Commanding General, Air Matériel Command. They were directed to support the operations under General Ramey's command. That afternoon, five C-54 Skymaster transports—loaded with spare parts, extra mechanics

and tool kits—were on their way to "advance base" at Panama.

General Ramey was prepared, however, should they not arrive. In the bomb-bays of his Superforts were special repair kits, for use on just such operations. With him were extra mechanics, expert troubleshooters who are accustomed to catering to all the eccentricities that the big Super-



XB-45 is a significant development in that it is America's first operational bomber utilizing jet propulsion. (AAF photo.)

forts develop. Within minutes after landing at Albrook, shortly after midnight Saturday, they were at work on the planes. Spare parts were on hand; extra assistance available. Not a man from the Panama command was required to service those aircraft. Albrook was merely a service station for gasoline and bombs. The operation of making those bombers combat-ready was accomplished by the flexibility and mobility of the strike force itself.

Let me emphasize once again: neither General Ramey and the 8th, nor Air Transport and Matériel Commands, had any idea, prior to Saturday morning, that such a mission would be ordered. Yet they were on their way in just over six hours. That mobility is just as adaptable to Alaska, the Aleutians, Japan, the Philippines, Hawaii or Germany as it is to Panama. We have made it so; we will make it even more so.

In a very real sense, the aerial task forces of today—small, hard-hitting, powerful and fast—are moving in to replace the ponderous masses of men and equipment which comprised striking forces of any type in previous years. We have tuned our equipment and our men to that concept. We have placed ourselves literally on instantaneous notice for any emergency.

In our command rooms at headquarters



B-36 and B-29—Long range, very heavy bombardment planes expected to be employed by Strategic Air Command for the immediate future. (AAF photo.)

both in the field and here in Washington, the status of aircraft, of aircraft crews and of maintenance personnel is modified and corrected as fast as changes occur. We know to the last man and to the last airplane and engine what we have available and how quickly it can be made available. We are swiftly reaching our desired goal: that of being a production line of available power.

Finally, we reach our third policy: the concept that range is no obstacle, and the emphasis the Air Force must—by virtue of its striking power and available weapons—place upon its role as a means of maintaining American national policy.

Accepting as fact that American Air Power is America's most effective weapon for peace, it is self-evident that geographical restrictions cannot be countenanced. They cannot be countenanced in planning, in training or in actual flight.

Today, Strategic Air Command is en-

gaged in a rotation policy without precedent in military annals. Our combat crews, in an average year, are seeing training and duty in the United States, Europe, the Far East and the Far North. They are learning their geography as they fly. They are learning that this world of ours, on the airman's scale, is an ever-contracting globe. They are gaining, through that knowledge, skills essential to the future defense of this country. The airman who recognizes the complete potential of the machine he has mastered can better appreciate the potential of the foe he may some day have to face.

Our global orientation program is not confined to a single crew or a single unit. It will be standard operating procedure throughout Strategic Air Command. It will affect, over a twelve-month period, every squadron and every crew. It is our own interpretation of the global concept. Its value for the preservation of peace, or for effective operations in time of war, cannot be over-emphasized.

Modern warfare, even as warfare of the future, will be opened by powerful air assaults which will seek by a swift series of paralyzing attacks to destroy the opposing air forces or to at least reduce them to ineffectual units. Coincident with or closely following these operations comes the ruthless smashing of the centers of industry and population. Paratroopers and airborne troops then seize key points of the battered country and surface forces follow as swiftly as possible to consolidate the victory and occupy the country.

This is the *blitz* pattern of World War II. Poland fell in seventeen days. Norway and Belgium in two weeks. The capitulation of France and the eviction of the British Army at Dunkerque actually took forty days—from 10 May to 19 June 1940. Crete, Buna, Nadzab and Corregidor are a few other examples of the application of airpower and airborne operations to modern warfare.

New weapons and new techniques vastly increase the destructive and decisive capabilities of such an offensive pattern. The tempo of warfare is going up all the time. United States Army ground leaders have already swung whole-heartedly into the airborne program; they realize its flexibility and its capabilities. The Army and its equipment are being redesigned for airborne warfare. It is the responsibility of Strategic Air Command to maintain its striking force *in being* in the state of readiness I have described so as to discourage any potential enemy, whether by surprise or announced attack, from undertaking aggressive action against this country.

In air war, as in all war, there are three phases, assault, retaliation and decision. Decision is based on success in



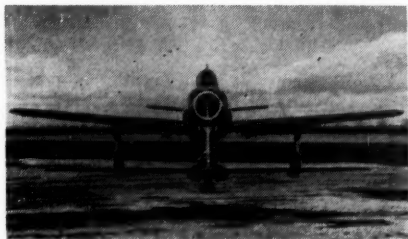
A "radical" design soon to be obsolete. The P-80. (AAF photo.)

either of the other two phases. As democratic and peace-loving philosophies deny us the role of the aggressor, it is our evident responsibility to be sufficiently strong to defeat the enemy assault, and by retaliatory action, eventually gain the decision.

The evolution and development of new weapons, with ever increasing speeds, range and firepower, has a continuing effect on the capabilities of Strategic Air Command in range and striking power. We recognize as a combat unit, perhaps even more keenly than other elements of our national defense structure, that each new development is changing previous concepts of Strategic Air Power.

Just over the horizon, in that category, is the B-36, mightiest bomber ever developed by this or any other nation. It will open another era in the development of airpower; the advent of the Very Heavy Bombardment airplane capable of reaching any spot on the globe and returning to its base.

There is the B-50, the drastically



P-84 "Thunderjet" held the U.S. speed record of 619 mph. (AAF photo.)

modified and more powerful version of Boeing's battle-tested B-29. Only slightly farther ahead lie jet-powered bombers and with them will come fresh techniques. For in an era of speed, mental processes must be as keyed to the times as the machines which dictate the rate of progress of the times.

Our fighters are improving with equal rapidity. The P-80 Shooting Star, still a "radical" departure in design and engine, will be on the obsolete list in a matter of months. Newer, faster, longer-ranged types already threaten to outdate it. Such frequent changes, such rapid obsolescence forces combat pilots and staffs alike to revise constantly their concepts and be continually undergoing training.

A command forced to change its thinking radically and often is an alert, active, progressive and hard-hitting organization. That is the goal toward which Strategic Air Command is directing its efforts.

Community Relations

and the

Army Advisory Committees

Colonel Guy V. Miller, *Field Artillery*
Chief of Information, Second Army

OUR Army has no greater responsibility today than that of establishing and maintaining cordial and intelligent relations with the American people. An informed nation is an intelligent nation and the American Army has nothing to fear from such a public.

In fact, if the American Army is to discharge the responsibilities imposed upon it intelligently and properly, it must take the American people into its confidence, reveal its needs for future security, and above all else, seek the reactions of the people upon whom we must depend for our very existence.

Thus, community relations constitute one of the major activities of the Army at the present time. It is vitally essential that the Army's plans and problems be understood, and that there be a frank and friendly relationship at all times between all Army personnel of all commands, no matter at what level, and the civilians of the forty-eight states with whom we deal. It is particularly important that this understanding exist between the posts, camps and stations and the communities surrounding them.

The Second Army has met this community relations responsibility—and continues to meet it every day. Major General Manton S. Eddy, the Deputy Army Commander, has written every post, camp and station commander in the Army's seven

state area suggesting that an officer be designated to handle community relationships with nearby cities and towns. This staff officer visits each town in the vicinity at least once a month. He calls upon the mayor, chief of police, the chairman of the Army Advisory Committee, if one exists in the town, and other leading and influential citizens. He is a liaison between the Army and community clubs and civic organizations such as the Lions, Rotary and Chamber of Commerce. He helps them secure speakers and programs for their meetings, utilizing every opportunity to bring about closer and friendlier relations between the community and the nearby post, camp or station.

In cementing good community relations, no medium has been more helpful to the Second Army than the Army Advisory Committee. It has been one of the best sources of information that we have—both to inform the public on what we are doing, and to tell us what the public thinks of the Army.

The idea for the Army Advisory Committees had its origin in the mind of General Eddy when he was in command of the former Third Service Command. At that time, the Army was much concerned over the seeming inertia of the people. The Army had important commitments abroad which it could not carry out unless sufficient manpower was provided. Recruiting was almost at a standstill. We were

witnessing a public indifference that frequently follows a long war.

It was decided in the Third Service Command to take the problem directly to the people. It was believed that, if given the facts, the people would provide the Army with the soldiers it needed.

Funds which were made available for recruiting made it possible to organize these Committees. A series of luncheons was held in Baltimore, Pittsburg, Philadelphia, Harrisburg, and Richmond. To these luncheons were invited the most prominent civic leaders of those respective cities; leaders of civic clubs, veterans organizations, educators, the clergy, business and professional groups. These civic leaders were requested to assist in the nationwide recruiting campaign.

The response to the pleas for help was remarkable from the very beginning. These leaders in business and the professions were not only sympathetic but were as much concerned as we were over the gravity of the Army's situation.

When told how necessary it was for the Army to have recruits immediately, merchants in all towns donated window space for advertising.

Sponsors for radio programs put in a good word and business firms sponsored outdoor billboards.

The schools cooperated by permitting our recruiting people to address students, and many college presidents gave their time and facilities to help the Army.

This kind of cooperation resulted in the Second Army securing more than twenty per cent of the one million men that joined the Army last year.

From that beginning, the Army Advisory Committees have expanded to their present community relations role. Today there are 162 committees established and functioning in the seven states of the Second Army Area, with a total membership of more than 3,000 men and women. The Committees are distributed as follows:

Indiana, 26; Kentucky, 15; Ohio, 30; West Virginia, 13; Virginia, 20; Maryland, 8; Pennsylvania, 52.

Briefly, the mission of the Army Advisory Committees is as follows:

1. To promote and participate in projects which will foster good relations between the public and the Armed Forces.

2. Give public endorsement, when justified, to Army sponsored endeavors such as the recruiting program, the organization of the Reserve Corps, and the National Guard.

3. Assist in scheduling parades, exhibits and other local military affairs at public gatherings.

4. Assist in disseminating information about Army plans and releasing information to the press and by talks and speeches before civic, educational and religious groups.

5. Inform the Army Commander of public trends and opinions insofar as they affect the Army's program in the community, and to make recommendations on appropriate military matters which involve community interests. In fact those Committees act as "barometers" of public opinion relative to military matters that concern the public.

The Committee members are chosen with care and represent the outstanding men and women in the various communities. In selecting members we seek to avoid "yes-men." On the contrary, preference is given to individuals who are willing to express their opinions with vigor and candor. These Committees are composed of civilians, selected by civilians, and run by civilians.

The Committees meet periodically, every quarter if possible, and at the call of the chairman. Our District Executives keep in constant personal touch with committees and the Deputy Army Area Commander carries on a continuous correspondence with committee chairmen throughout the Army Area.

The work of these Committees is no one-sided affair. The Army has a distinct obligation in return. We must provide the Committees with factual and timely information on military matters that concern the public. We must conceal nothing that the public should know.

We must stand ready at all times to receive the Committee's recommendations and assist in developing them.

We must furnish the Committees, periodically, with bulletins covering the high-

lights of current activities of all components of the armed forces.

We must especially invite criticism of our activities and act upon it with intelligence.

It is interesting to know that the War Department was so favorably impressed with the Army Advisory Committees organized in the Second Army Area that it directed all Armies to organize similar committees. Such committees, throughout the United States, are now in the process of being organized.

A total security program has still other major aspects. A military program, standing alone, is useless. It must be supported in peacetime by planning for industrial mobilization and for development of industrial and raw material resources where these are insufficient.

President Harry S. Truman

The fact remains, however, that nations still talk, and act, in terms of force. So long as that is the case, disarmament by us alone would deprive us of all ability to promote the cause of peace. It would do more—it would expose our people to the greatest peril. The paramount point is that in this day and age, our foreign policy, fair and just as it is, is only as firm as the military forces that sustain it. Maintenance of military forces in strength, in this period of transition from war to peace, is our sure safeguard. That will cost money, but no investment will pay such big dividends.

Secretary of War Robert P. Patterson

The 2d Armored Division in Operation "Cobra"

Lieutenant Colonel H. M. Exton, *Field Artillery*
Instructor, Command and General Staff College

Introduction

THERE have been numerous articles covering the general attack of the U.S. First Army which broke out of the Normandy beachhead, drove the German forces to the east in a war of movement, and hastened the end of the war. This article will briefly touch on the attack of the VII Corps which spearheaded the First Army attack, and then discuss more completely the attack of the 2d Armored Division which in turn spearheaded the attack of the VII Corps.

This breakthrough attack of First Army was labeled operation "Cobra" (Map 1).

Mission of VII Corps

The mission of the VII Corps was to make a quick break through the enemy's front line, push south between Marigny and St. Lo, and establish a defended corridor between these two points through which combined armored-infantry elements would drive and pivot in the vicinity of Marigny, rush south and west to the sea between Coutances and Brehal. The purpose of this drive by the armor was to cut off enemy forces facing VIII Corps on the right, and assist in the destruction of these forces; and to block the movement of enemy reinforcements from the south or east.

Preceding the attack by the ground units, a gigantic armada of bombers and fighters was to accomplish a saturation bombing of the breakthrough area in the greatest concentration of air power in

support of ground forces in the history of warfare.

The VIII Corps was to attack in conjunction with VII Corps to destroy the enemy on its front.

The XIX and V Corps on the left were to attack after D-day and pin down enemy reserves east of the Vire River.

Missions of VII Corps Units

For this operation the VII Corps consisted of six strongly reinforced divisions: The 1st, 4th, 9th and 30th Infantry Divisions, and the 2d and 3d Armored Divisions.

The plan of the attack is shown on Map 2. The missions assigned to the different units were:

1. The 4th, 9th, and 30th Infantry Divisions were to attack, following the artillery and air preparation, to clear the Marigny—St. Gilles gap as rapidly as possible for the exploiting forces.

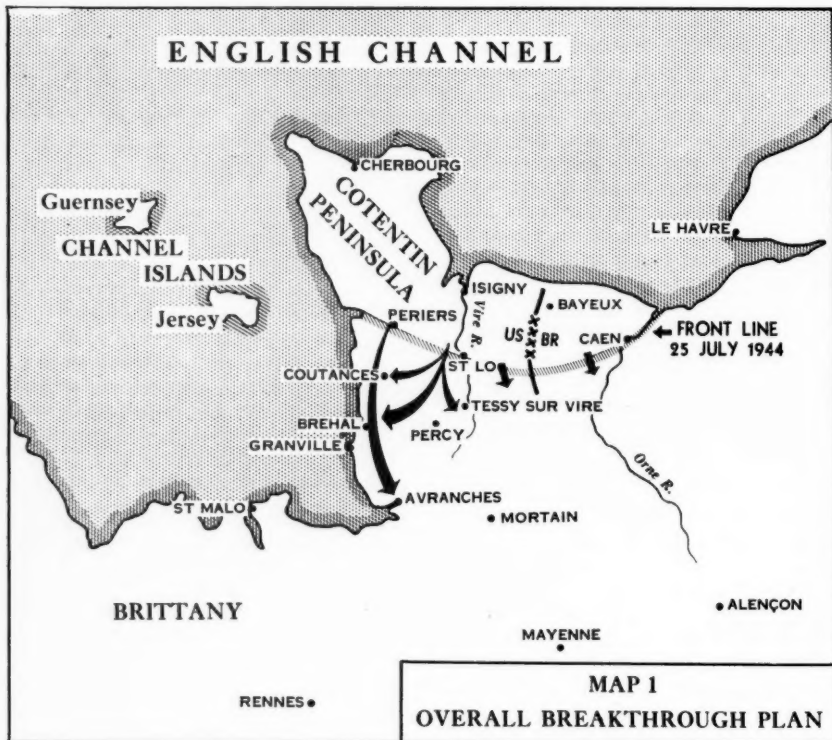
2. The 4th Infantry Division was to protect the gap from attack from the south and clear the route of the 3d Armored Division within its zone.

3. The 30th Infantry Division was to protect the left flank of the corps penetration, continue the attack to seize a crossing over the Vire River, prevent enemy reinforcements from the east from crossing the Vire, and then clear all traffic in its zone for the 2d Armored Division.

4. The 1st Infantry Division, with Combat Command "B" of the 3d Armored Division attached, was to drive through the

gap cleared by the 9th Infantry Division, turn rapidly to the southwest, block and assist in destroying enemy forces in front of the VIII Corps between Coutances and Fontenay, and maintain contact with the 3d Armored Division on its left. Movement through the gap was to commence on two

Division attached, was to strike through the gap cleared by the 30th Division to seize initially the area shown on Map 2, in order to cover the movement of the 1st Infantry Division and the 3d Armored Division. It would push one combat command to the southwest to the vicinity of



hours' notice from the Commanding General VII Corps.

5. The 3d Armored Division, less CC "B," was to drive through the gap cleared by the 4th Infantry Division, move rapidly to the southwest, seize the southern exits of Coutances, and secure the south flank of the 1st Division.

6. The 2d Armored Division, with the 22d Regimental Combat Team of the 4th

the St. Gilles—Canisy road prepared on orders to seize and secure objectives within its zone of action as shown in order to prevent enemy reinforcements from moving to the north through this area, and to be prepared to move on Coutances to reinforce the 3d Armored Division, or to move to the southeast to reinforce the remainder of the 2d Armored Division in its mission. Each Combat Command was to

have continuous column cover of four P-47s in addition to armed reconnaissance air support.

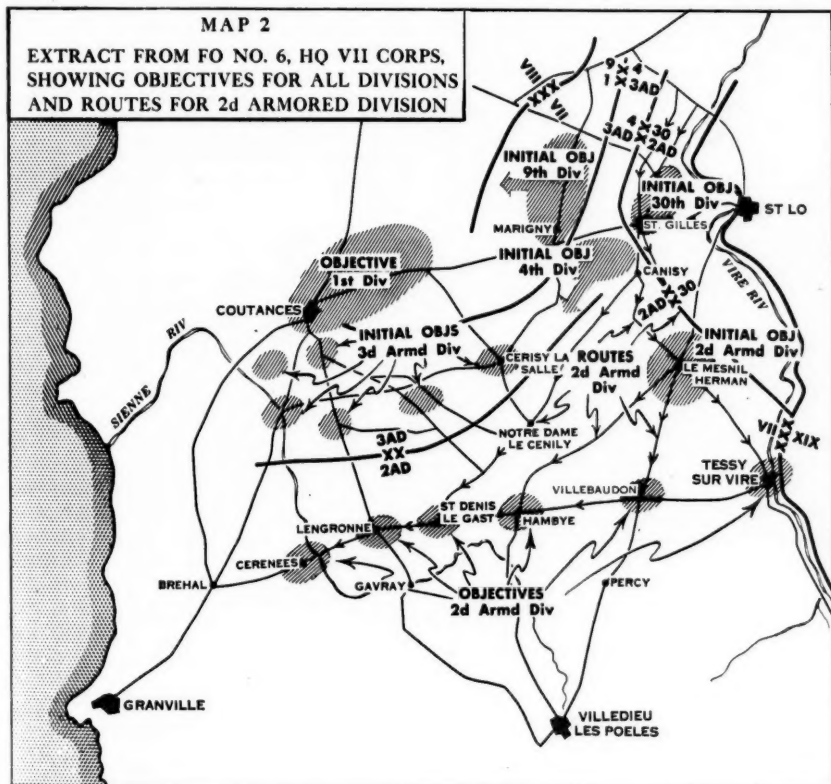
Enemy Situation

Enemy forces encountered by the exploiting forces were to be contained and bypassed until objectives had been secured. The enemy was known to have the follow-

ing units on the VII Corps front: 5th Parachute Division, Panzer "Lehr" Division, 2d SS Panzer Division, 3d Parachute Division, and 265th Infantry Division. These units were known to be all greatly under strength. From thirty-five to fifty tanks were estimated to be present on the

Organization for Combat of the 2d Armored Division

The organization of the 2d Armored Di-



ing units on the VII Corps front: 5th Parachute Division, Panzer "Lehr" Division, 2d SS Panzer Division, 3d Parachute Division, and 265th Infantry Division. These units were known to be all greatly under strength. From thirty-five to fifty tanks were estimated to be present on the

vision for operation "Cobra" was as follows:

Combat Command "A":

66th Armored Regiment.

14th Armored Field Artillery Battalion.

22d Regimental Combat Team from

4th Division with normal attachments.

702d Tank Destroyer Battalion (less one company).

Attachments of Engineer, Medical, Antiaircraft, and Maintenance units.

Combat Command "B":

67th Armored Regiment (less 3d Battalion).

78th Armored Field Artillery Battalion).

1st and 3d Battalions, 41st Armored Infantry Regiment.

Attachments of Engineer, Medical, Tank Destroyer, and Maintenance units.

Division Reserve:

41st Armored Infantry Regiment (less two battalions).

3d Battalion 67th Armored Regiment.

Division Artillery:

62d Armored Field Artillery Battalion (attached).

65th Armored Field Artillery Battalion (attached).

92d Armored Field Artillery Battalion (organic to 2d Armored Division).

Battery C 195th AAA Battalion (AW) (SP).

Batteries C, D, 129th AAA Battalion.

Division Troops:

Headquarters and Headquarters Company 2d Armored Division.

142d Armored Signal Company.

82d Armored Reconnaissance Battalion.

24th Reconnaissance Squadron Mechanized (less one troop) (attached).

Headquarters 195th AAA Battalion (AW) (SP).

17th Armored Engineer Battalion (less five companies).

After the operation commenced, the 24th Cavalry Squadron was attached to Combat Command "A." The 62d Armored Field Artillery Battalion was placed in general support of Combat Command "B" reinforcing the fires of the 78th Armored Field Ar-

tillery Battalion. The remainder of the division artillery followed Combat Command "B" in general support of it and the Division Reserve.

Attack of Combat Command "A"

Combat Command "A" was to lead the attack of the division, seize the initial objective in vicinity of Le Mesnil Herman, and continue to capture the objectives of Villebaudon and Tessy Sur Vire.

Following the saturation bombing, about noon, 25 July, the 4th, 9th, and 30th Infantry Divisions attacked toward their respective objectives.

Combat Command "A" started moving from its assembly area during the morning of 26 July, and crossed the St. Lo—Periers road at 0945. It was initially in one column but soon split into two columns with the 2d and 3d Battalions, 66th Armored Regiment, abreast, operating with the 1st and 2d Battalions, 22d Infantry Regiment. The tank units were delayed by difficult terrain and passed through the 30th Infantry Division, but the Marigny—St. Gilles gap was only partially cleared. They made contact with the enemy at 1030 and forced him back steadily. By 1400 reconnaissance elements had reached St. Gilles and by 1500 the Combat Command had a firm hold on the town and had secured the east-west road running through it.

The advance then continued toward Canisy in one column against light resistance. The conditions of the roads and terrain, however, slowed the progress. Just north of Canisy a railroad underpass had been blown which caused further delay. The Combat Command reached Canisy at 1900, again split into two columns and pushed on astride the Canisy—Le Mesnil Herman road toward the initial objective. Further obstacles and strong resistance were encountered, but by 2400, 26 July, leading elements were 2,000 yards south of Canisy. This represented an advance of eight kilometers for the day.

Early next morning 27 July, the advance was resumed, and by 0800 Combat Command "A" had seized Le Mesnil Herman. The positions were then consolidated. The 1st Battalion, 66th Armored Regiment was ordered to reconnoiter in force toward Tessy Sur Vire, the 3d Battalion toward Villebaudon, and the 2d Battalion was ordered to capture Hill 183. The 2d Battalion accomplished its mission at 1500 and was relieved by infantry units. Strong resistance, antitank guns, and road blocks limited further advance that day.

On 28 July, Combat Command "A" was attached to XIX Corps and given the mission of securing the Corps objective as shown on Map 3. The attack was launched in three columns. The east column attacked toward Tessy Sur Vire against tanks, antitank guns, and infantry supported by artillery. Steady progress was made, and by 2200 high ground south of Le Mesnil Opac had been seized. At one time, the column was cut by a German counterattack but the enemy elements were surrounded and reduced. The center column seized the high ground north of Moyon, but found the town strongly held by superior enemy forces. A frontal attack on the town was unsuccessful so it was decided to make a wide encircling movement to approach the town from the rear the next day. The west column, meeting little resistance, pushed on rapidly and captured Villebaudon.

On 29 July the west column continued its advance and approached Percy. The center column was relieved in its position north of Moyon by infantry of the 29th Infantry Division and began its encircling movement through Villebaudon. There it received a strong enemy counterattack supported by intense artillery fire and tanks. The east column resumed its attack from Le Mesnil Opac at 0800 and made slow but steady progress until 1800 when it was ordered to break contact and assemble.

On 30 July, the west column was cut off

by elements of the 116th Panzer Division. However, it continued its southerly drive and by 2000 had captured Percy.

The 2d Battalion, 66th Armored Regiment, and the 1st Battalion, 22d Infantry, which had composed the center column attacking Moyon, continued its effort to push through Villebaudon to attack Tessy Sur Vire. For thirteen hours the action swayed back and forth, until the last of several vigorous enemy counterattacks by elements of the 2d and 116th Panzer Divisions was repulsed and the town was secured. One enemy counterattack employed forty tanks, in addition to heavy artillery fire, in support of the infantry. The 14th Armored Field Artillery Battalion, which was supporting Combat Command "A," was twice surrounded by the Germans, and had to defend its position with direct fire and infantry tactics. By nightfall the 1st Battalion, 22d Infantry held the town and the 2d Battalion, 66th Armored Regiment moved to an assembly area northwest of the town.

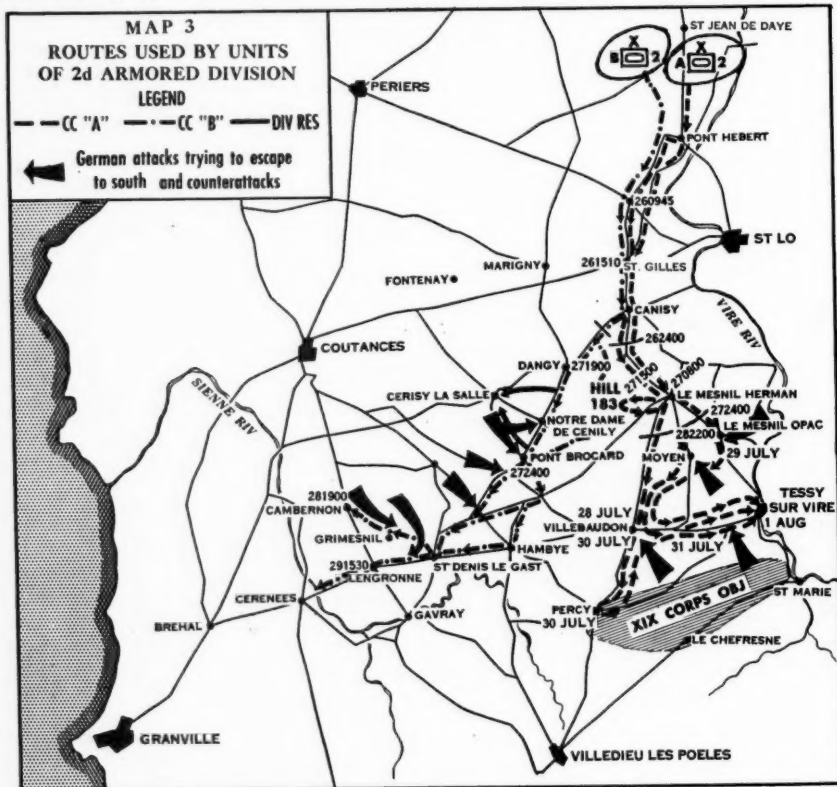
The Commanding General, Combat Command "A," believing that his command would be entirely cut off if he committed the balance of his force with the tank force at Percy, requested and received permission to concentrate all of his efforts on the capture of Tessy Sur Vire.

On 31 July, the 1st and 2d Battalions, 66th Armored Regiment, attacked along the axis of the Tessy Sur Vire road. Fighting against continued strong resistance and rough terrain, the Combat Command advanced 2,000 yards during the day. At dawn 1 August, the 3d Battalion, 66th Armored Regiment, joined the attack from vicinity of Villebaudon with the mission of capturing Tessy Sur Vire. The attack employed a secondary road north of the highway as an axis. Taking advantage of a ground mist, the battalion overran and destroyed a column of enemy vehicles, and continued to the high ground northwest of Tessy Sur

Vire. Two tanks entered the town at 1030, but were engaged by a superior number of German tanks and destroyed. The enemy launched determined counterattacks which isolated the 3d Battalion in its position on the high ground until later relieved by other Combat Command

tions south of Tessy Sur Vire and east of the Vire River. Combat Command "A" moved in, and secured the town for the night.

Thus, the last objective of the breakthrough phase of operation "Cobra" was seized, and Combat Command "A" pre-



units. At 1500 the 1st and 2d Battalions, 66th Armored Regiment, and elements of the 22d Infantry, attacked astride the highway. The enemy offered strong resistance with artillery and many Mk IV and Mk V tanks in concealed positions along the road. However, continued pressure by the Combat Command "A" units forced the enemy to withdraw to posi-

pared to continue its advance to the south the following day.

The mission of Combat Command "A" had been not to gain ground but to hold off enemy reinforcements coming from the east. The constant, battering, offensive tactics of the combat command cost it a high percentage of its medium tank strength, but it kept the major elements

of both the 2d and 116th Panzer Divisions completely occupied, and prevented the launching of a coordinated counteroffensive which would have affected the course of the entire operation. The capture of Tessy Sur Vire and the withdrawal of the enemy to the east bank of the Vire River completely ended the German chances of interfering with the operations which were by that time nearing the Brittany Peninsula.

Attack of Combat Command "B"

The attack of Combat Command "B" was initially delayed by heavy traffic on the roads, and in waiting for Combat Command "A" to clear. The reconnaissance and advance guard elements crossed the St. Lo—Periers road at 1100, 27 July. Combat Command "B," in one column, followed and continued through Canisy, thence to the southwest. About 1500 yards southwest of Canisy on the Pont Brocard road, an enemy position astride the road was engaged. An envelopment of the enemy's left flank and bombing attacks by the supporting P-47s eliminated the resistance and the advance was continued in two columns. Dangy was seized at 1900 and Pont Brocard was occupied by nightfall. Elements of the 82d Reconnaissance Battalion, which was covering the Combat Command "B" advance, reached Notre Dame de Cenilly at 2400. This represented an advance of twelve miles for the day.

A rather interesting aftermath of this advance came after the war when General Fritz Bayerlein, commander of the Panzer "Lehr" Division was captured. He stated that he had been having a staff meeting in Dangy at 1730, 27 July, when American tanks approached the town. He and his staff hid in one of the houses while the tanks passed through, and when they were gone, he made good his escape. He found a mobile radio station and notified his corps commander that nothing remained of his division.

On 28 July, the 82d Reconnaissance Battalion continued its advance, and its patrols reached Lengronne and the Sienne River. An advance task force, consisting of one company from the 67th Armored Regiment and one company from the 41st Infantry Regiment, rapidly pushed forward and seized the crossroads on the Coutances—Gavray highway at Cambernon.

During the early afternoon, the Germans launched a stiff attack from Cerisy La Salle toward Pont Brocard and Notre Dame against the right (north) column. The intensity of this attack required the commitment of the Division Reserve which had been following Combat Command "B." A coordinated tank-infantry attack, was launched by the Division Reserve toward Cerisy La Salle at 2100. The enemy force was dispersed and the town was occupied by midnight. The right (north) column in the meantime had pushed on west of Notre Dame in order to maintain the momentum of the drive to the final objectives.

On 29 July, elements of the 4th Infantry Division took up positions protecting the flanks of Combat Command "B" and consolidated its positions. In the morning a strong enemy force of paratroopers supported by tanks and artillery attempted to break through to the south at the cross roads just west of Notre Dame. The covering force of infantry from the 4th Division was driven back into the area of the 78th Armored Field Artillery Battalion which was supporting the advance of Combat Command "B" to the west from positions around this crossroads. The artillerymen became infantrymen for the occasion, and with direct 105-mm howitzer fire, beat back the German attack, destroying seven tanks and killing 126 men. Elements of the Division Reserve then mopped up the remnants.

The 1st Battalion, 41st Infantry, and

the 1st Battalion, 67th Armored Regiment continued the advance and captured Lengronne by 1530. Outposts were placed at St. Denis Le Gast and Hambye.

The task force of one infantry company and one tank company, which had reached Cambernon on the 28th had been cut off for several hours, but held and improved its position under the protection of artillery fire.

The 2d Battalion, 67th Armored Regiment, and the 3d Battalion, 41st Infantry, advanced toward Cambernon, occupied high ground on the left of the road, and established contact with this isolated task force. The Division Reserve was given the mission of blocking enemy escape routes as far west as Grimesnil. Shortly after dark, while units were still moving into position, a German force of 600 infantrymen and tanks of the 2d SS "Das Reich" Panzer Division assaulted the Division Reserve and broke through portions of its position in a fierce engagement resulting in severe casualties to both forces. A major part of the German force pushed through, overran the outpost at St. Denis Le Gast, and turned west. It then ran into the position area of the 78th Armored Field Artillery Battalion which, with 105-mm direct fire at ranges from forty yards up, and with all available automatic weapons, completely destroyed the German column. This engagement lasted until dawn 30 July.

At about 0200, 30 July, another German column of ninety vehicles and 2,000 men moved south over secondary roads onto the Cambernon—St. Denis road and hit the 2d Battalion, 67th Armored Regiment, and 3d Battalion, 41st Infantry. The terrain was such that the German vehicles could not move off the road, so, when the leading tank was destroyed, the column came to a halt. All weapons, including artillery from the 78th Field Artillery Battalion not engaged in the fight in its own area, were brought to bear

on this column. Every vehicle was destroyed and an estimated 500 enemy killed.

These two break-out attempts represented the last coordinated gasps for freedom of the trapped enemy forces to the north, and on 30 July, Combat Command "B" and the Division Reserve were ordered to assemble and reorganize. The sector was turned over to the 4th Armored Division and the 1st Infantry Division. Thus Combat Command "B's" breakthrough phase of operation "Cobra" was completed and the division less Combat Command "A" occupied assembly areas in vicinity of Pont Brocard to prepare for future action to the south.

Conclusion

During the July phase of operation "Cobra," the 2d Armored Division killed 1,500 and captured 5,000 enemy, and destroyed 500 vehicles. The division itself suffered 676 casualties for the period.

This operation was the first time in World War II that a U.S. Armored Division was used as a division in the classic role of armor passing through a gap created by infantry, and then exploiting the breakthrough. The outstanding success of this operation created the opportunity to shake loose the U.S. Third Army for further exploitation.

It should be noted that the 2d Armored Division was a "heavy" division. In other words, its organization consisted of two armored regiments of three tank battalions each and one infantry regiment of three battalions as opposed to the later armored division's three tank battalions and three infantry battalions. This superior tank strength gave the "heavy" armored division the shock force which was ideally suited for an action such as operation "Cobra."

This was also the first time that fighter-bombers were used in close support of armor. Flights of P-47s continually relieved each other so that each combat com-

mand always had fighter support. An air liaison officer rode in a tank with the advance guard, and in a matter of minutes could call for bombing or strafing attacks on resistance encountered.

Another successful employment of aircraft was the use of division liaison planes in cooperation with the leading reconnaissance elements. This not only helped to keep commanders fully informed of the enemy, but also was a splendid means of controlling the advance of their columns.

This action of the 2d Armored Division well demonstrated that there is one principle of armored tactics which cannot be overemphasized. That is aggressiveness. The success of the division was achieved primarily because units were ordered not to stop, but to keep driving regardless of resistance or losses. In many cases, when the lead tank drew fire, following tanks

quickly deployed and pushed on through or enveloped the resistance. This aggressiveness resulted in fewer losses in men and matériel than deliberate maneuver which would have given the enemy time to bring up reserves and additional fire power. It must be added, however, that this aggressiveness must be coordinated. Furthermore, to achieve this coordination, radio communications must be in top shape. Close and complete control is of vital importance.

Finally, this action illustrates the wisdom of careful prior planning and the launching of an armored attack at the proper moment. The armored division is a special weapon which will reap tremendous dividends when employed at the correct time and place, but which may fail miserably if employed too soon, piecemeal, or at the wrong time.

Since all active theaters of operation were overseas, the United States Army was wholly dependent upon ocean transport in making its strength effective against the enemy. The only way the cause of the democracies could be vindicated was to attack and defeat the foe on his own soil. The Axis powers were as well aware of that fact as we were, and they did all they could to capitalize upon it. Germany particularly, from the early days of Hitler's regime, stressed the construction of submarines. The undersea raider had almost accomplished its purpose in the last war; now there were improved types of U-boats available, air power was an added menace to shipping, and the Allies again were unprepared.

During 1940 and the early part of 1941 there were several months when the Allied shipping losses exceeded the combined shipping output of the United Kingdom and the United States by more than 500,000 deadweight tons. The winning of the war required not only that losses be offset by new construction, but that they be exceeded by a substantial margin in order that sufficient shipping eventually might be available to the United Nations to enable them to launch the heavy offensives which were necessary to the defeat of the Axis. There were two means to this end—reduction of the losses by improved defensive and offensive measures, and a colossal ship construction program. Both means were pursued with utmost vigor.

Report of the Chief of Transportation

Estimates of Enemy Strength

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Foreword

THE purpose of this paper is to discuss some of the methods of estimating combat strength of enemy tactical units, as developed in the G-2 Section of II Corps in North Africa, Sicily, and Italy in 1942-1945. Nearly all conclusions recorded below have been based on observation of the German Army, and to a lesser extent of the Italian Army, during that period.

For the sake of conciseness, the problem of computing enemy strength will be artificially isolated from numerous other intelligence problems, which will be treated here only in so far as they have a bearing on determining enemy combat strength. This discussion will be limited to infantry type units of battalion size during their commitment in line. Likewise in dealing with enemy replacements we shall confine ourselves to discussing ordinary replacements arriving at a conventional German outfit. The intricate problem of determining the composition and estimating the strength of enemy "battle groups," or small composite task forces, which were such a striking feature of the German Army, will not be touched upon. Throughout this paper it will be artificially assumed that we are familiar with the composition and disposition in line of enemy units facing us; in practice, of course, this is by no means always the case.

At the very outset, the reader should be warned that this paper does not pur-

port to establish any set of universally applicable solutions to the problems which beset an estimator of enemy strength. The formulae adduced here are only examples of a line of reasoning which was found occasionally applicable to certain specific German and Italian units at a certain given time. It cannot be overemphasized that one and the same formula could never be applied to all enemy outfits, or even to the same outfit at all times; it had to be checked and revised in the light of recent evidence before it could be used in any individual case.

Combat Strength

For the purpose of this paper, combat strength of an outfit will be defined as the number of men which its commander has at his disposal at a given moment for immediate infantry combat commitment without impairing the functioning of the outfit as a whole. In German units of company size, under normal conditions, combat strength usually represented approximately seventy-five per cent of the total strength of the company. In a battalion, combat strength comprised approximately two-thirds of the total, in a regiment it was close to fifty per cent, while in a division it usually dropped down to about thirty per cent of the overall strength.

The level of basic infantry training attained by all troops is usually the chief factor which determines the extent to which the non-combat elements can be

used as a pool of potential combat troops. In the German Army, where this level was exceptionally high, nearly the whole of the non-combat contingent could in theory be regarded as a reservoir of combat strength. Usually a German unit would begin to draw heavily on this pool to replenish its combat element after its casualties had amounted to approximately fifty per cent of its original combat strength. The majority of German units could afford to use up about fifty per cent of their non-combat element as combat replacements before the stage of total collapse was reached.

Sources of Information

Most information of the enemy has some bearing on enemy strength, but the exact significance of every item of information must be determined separately in each individual case, according to circumstances of the moment. Here we shall deal only with the most common sources of information which were available to the G-2 Section of II Corps.

a. Prisoners of War.—Let us assume that a prisoner of war belonging to a European army is not trying to deceive the interrogator, but states the plain truth *as he sees it*. One can hardly underestimate the depth of an average prisoner's ignorance. It is a common failing among many inexperienced interrogators to treat every PW as if he were a general staff officer.

Very few individuals are endowed with the gift of estimating correctly and precisely the size of a large group to which they belong. While a German company was in line, only the company clerk and the mess sergeant, as well as some of the medical personnel seemed to have had a fairly accurate idea of the strength of their outfit; even the company commander was liable to err on this point, especially if he happened to be captured.

In a static situation, an average German soldier had a fair idea of the size

of his own platoon and of its recent losses. His notion of the other platoons of his company was somewhat hazy. Usually he knew from hearsay which companies were on his right and left flanks, but of their strength he heard only vague rumors; it was, therefore, impossible to find out from him the strength of his battalion as a whole. His knowledge of rear installations of his company was also limited to hearsay for the most part. We should bear in mind that when a German company received replacements, in the beginning, the new men usually stayed with the company trains, and the fact of their arrival as well as their number were either totally unknown to the soldier in the front line, or known to him in a distorted form. Any sort of reliable information on replacements came to his knowledge only after these replacements had begun to trickle through to the line. Thus frequently our intelligence agencies were able to get fairly accurate information on enemy losses within two days of their occurrence, but the arrival of replacements to a line company could remain unknown to them for ten to fourteen days.

In a mobile situation, a German soldier would come to meet many members of his own and other outfits; frequently he would lose his own outfit and attach himself to another unit; but such information as he would pick up, besides being fragmentary, would rapidly become outdated; moreover, the chaos of mobile action was usually conducive to the rise of fantastic rumors.

Lastly, the prisoner's state of mind should be taken into account. Tactical interrogation should as a rule be conducted within a few hours after capture. At this time, the PW, if he has grown up in a country where Western Civilization forms the dominant pattern of life, is usually suffering from a nervous shock resulting from his recent experience. He tends to interpret his own misadventure

as a calamity to his whole outfit, and, to his imagination, the situation of his unit appears to be much worse than it is in reality. His estimate of its numerical strength is generally much lower than in fact obtains. If such a prisoner happens to be wounded, he invariably has a very exaggerated view of the losses sustained by his outfit.

Deserters from a European army (with the exception of "plants") do not change this picture appreciably. A deserter may possess good information on locations of weapons, strongpoints, and other installations in his sector, but there is no particular reason why he should take pains to inform himself of the exact strength of his outfit. A deserter either has a chip on his shoulder, or, which is more often the case, he has lost all heart in the fight. In the first case, he often tends to belittle his outfit; in the second case, his outlook on the prospects of his unit is very gloomy indeed. Hence the above considerations on PWs are in a large measure true with regard to most deserters from a European army, when we consider them as a source of information on strength.

In spite of its many shortcomings, information obtained from PWs and deserters remained one of our main sources for estimating enemy strength; often it was the only available source.

Fortunately, it was possible to introduce certain correctives to PW statements which tended to bring our picture of enemy strength closer to the truth. Through numerous comparisons of PW statements on strength with the actual figures, as later revealed in captured documents, it was possible to estimate the coefficient of underestimation to which a vast majority of German PWs and deserters were addicted. Usually, a German PW underestimated his company by twenty-five to thirty per cent. With wounded PWs, this coefficient was liable to be even higher. Thus, if a German PW reported that his

company had sixty men, it was fairly safe to assume that its combat strength was at least eighty, and its total strength in the neighborhood of 100 or slightly higher.

In determining which coefficient to apply as corrective in each particular case, one had to take into account the personality of the prisoner and the tactical situation of the moment. It was often advisable to check with the interrogator who had dealt with the prisoner. As a rule, the tendency to underestimate one's unit increased during a prolonged commitment in line in defensive positions; it became very pronounced during defensive action or retreat. This writer does not have sufficient material at hand to make any definite statement about the coefficient of distortion during an advance. It stands to reason that the tendency to underestimate would have been very much less than during a retreat.

b. Captured Documents.—Captured documents, especially strength, ration, and casualty reports gave us a very accurate idea of the strength of the reporting unit *as of the date of the document*. Unfortunately, very few such documents fell into our hands during a static situation; those which did, were, as a rule, very old. Many recent reports were captured during mobile operations, but they usually became outdated almost as soon as issued.

Captured documents were very valuable in establishing accurately enemy strength as of a past date. Thus they served mainly as a general check on PW statements, and provided a good starting point for "deductive estimates" which will be discussed later.

c. Observation, Ground and Air.—Ground observation from OPs and by patrols, as well as aerial observation and photography, provided us with only indirect data on enemy strength. For instance, the number of detected weapons (especially automatic weapons) or of bunkers and pillboxes (if they were not dummies) might give us an

idea of the *minimum* force necessary to man them. But we could never assume that we had spotted *all* the enemy weapons and installations. Moreover we did not always know the exact boundaries between enemy formations, and we were liable to be at a loss as to just which of the enemy outfits should have been credited with each particular weapon. Thus direct observation did provide us only with a general notion of a minimum number of troops facing us in a given sector. The value of such observation was considerable for determining the numerical strength of an armored unit. It was also of some use as a general check on our overall estimate.

Ground observation was seldom of help in detecting the arrival of German replacements, being limited to daylight hours, as well as by the nature of the terrain. Moreover, by the time German replacements reached the area open to ground observation, they were usually split up into such small groups, that it was virtually impossible to recognize them as replacements.

Aerial observation, not being limited in point of space, was much better suited for detecting the movement of large groups of replacements by convoy or train. Of course, utmost caution had to be exercised in concluding that a movement of troops discovered by Tactical Reconnaissance did involve an arrival of replacements. Once, however, this fact was established with reasonable probability, it could be assumed that the replacement pool of the division into whose area the convoy was arriving was being increased by the number of men the convoy was believed to carry. This information was of great value in computing a "deductive estimate" of the units of the division in question. Aerial observation was limited to periods of good weather and visibility, and was thus rather sporadic in nature; therefore, it could never be counted upon to detect all the replacement convoys of the enemy.

d. *Agents*.—Civilian agents were of

some use in detecting the arrival of large groups of replacements. Their main advantage over Tactical Reconnaissance was that they were usually in a position to keep their district under more or less constant surveillance. It was also easier for an observer from the ground to determine the nature of a convoy and to estimate the number of men it carried.

Agent information, however, suffers from serious inherent defects. A vast majority of agents have had no military training to speak of. The complexities of a modern army are so baffling to an average civilian, that his military observations, and especially his deductions, are liable to be very misleading indeed, if taken at their face value. Much depends on the personal temperament and on national characteristics of the observer; frequently he is prone to exaggerate or to introduce elements of his imagination into his reports.

Most agents either pursue their work for reasons of "filthy lucre" or for some other personal advantage, or else they are pure idealists. The former are usually low-grade characters whose veracity is at times very doubtful. The latter are given to tinging their reports with their emotions and with their ideas as to the line of action we should take.

Reports sent in by partisans frequently display this latter defect; but on the whole they are far superior to those of an average civilian agent, since most partisans quickly familiarize themselves with military problems.

Of course, occasionally it may be possible for trained military observers to penetrate behind enemy lines. If they combine acute powers of objective observation, veracity, and thorough military training, they can produce excellent reports on enemy troop movements. Needless to say, in practice such paragons are usually too few to man a whole extensive spy network covering a large area.

In spite of all these drawbacks, we

could not afford to neglect news of enemy replacement movements provided by an agent, especially if such news were corroborated by other agents or confirmed by Tactical Reconnaissance.

Agents' reports and Tactical Reconnaissance were practically the only means available for a timely detection of arrival of replacements to a German division, enemy troops in the line usually being ignorant of such movements until much later. Therefore, whoever tried to estimate German potential combat strength was forced to take into account agents' and Tactical Reconnaissance reports, evaluating them, of course, with utmost caution.

Methodology

How did one go about estimating the strength of a German battalion in line, using the sources discussed above?

The bulk of information at hand was usually provided by PW statements. After we had applied to them the correctives described in the section dealing with PWs, our difficulties were only about to begin. As a rule we did not capture prisoners daily from each of the four companies of the battalion. Therefore, our estimate was bound to be somewhat out of date, and there were discrepancies between the dates of our estimates for each of the battalion's companies. To correct these defects we used to have recourse to a "deductive estimate."

We had to estimate the losses sustained and the replacements received by the components of the German battalion in question since the last date of our information on their respective strengths. Then we had to subtract these losses from our original estimate, and add to the resulting figure the estimated replacements received for the period. If we sought to know the total strength of the battalion, we had to add approximately fifty men (to account for Bn Hq and services) to the sum of total strengths of its companies.

In our deductive reasoning in this field we could no more than make a reasonably intelligent estimate, based primarily on the general tactical situation during the period for which a corrective had to be calculated.

German losses were naturally very light during a quiet period, and increased sharply during infantry or artillery action. The normal ratio of German killed to wounded apparently remained fairly constant, at about 1:3. By watching an enemy outfit closely over a prolonged period it was sometimes possible to establish its individual normal ratio of PWs (exclusive of deserters) to killed at a certain given stage of the outfit's history. For example, we found that in the case of several top-notch German divisions in the Mediterranean Theater the normal ratio of PWs to killed to wounded was usually about 1:1:3. In a fairly good average division this same ratio was close to 2:1:3. Thus the number of PWs taken from such a unit in infantry action could occasionally give us some clue as to the total number of casualties sustained by it, provided that we were quite familiar with the unit in question. Of course each individual formula had to be revised fairly frequently, taking into consideration the nature of the replacements the enemy unit had been receiving, and many other pertinent factors. Before applying the unit's individual formula in each particular case, the computer had first to consider what changes the tactical situation of the period tended to introduce into the ratio of PWs to killed in action. For example, the normal ratio was not even remotely applicable if during the period under consideration the German unit had suffered a complete breakdown.

The number of enemy casualties sustained from each individual artillery barrage or aerial attack was a matter of pure conjecture; it depended largely on

the terrain and on the defensive works of the enemy.

A far more difficult task was to appraise the replacements received by the Germans. This was the weakest link in a deductive estimate, for there appeared to be no satisfactory method of accurately estimating the numbers of recently arrived replacements. German PWs usually did not know the replacement situation in the rear echelon of their companies and battalions as of the time of their capture. One could determine the average rate of flow of replacements; but this formula worked only for large units of division size, and then only over a long period of time. All we could do was to gather every available scrap of information on the divisional replacement pools.

By keeping an eye on divisional replacement pools we could venture a guess as to roughly how many men would be available as replacements to German battalions at the front. This gave the computer some material on which to base his estimate of the "replacement expectation" situation of the enemy outfit he was dealing with. In deciding how many of these expected replacements were to be included in the actual strength of the enemy outfit, one had to be guided solely by one's knowledge of the overall situation, by one's experience of the traditions of the particular enemy outfit, and by considerations of plain common sense.

It was sometimes found useful to take as our starting point a relatively remote date, about three weeks back, as of which we had definite and reliable information (e.g., from captured documents) on the

strength of the enemy outfit. Then we could see what results we arrived at in computing its strength by the "deductive method" just described. By itself this procedure was most unreliable, but occasionally it could serve to corroborate or to disprove our conclusions reached by other means. It had the advantage of starting with a figure known to be correct, and it gave a better chance for the long-range formulae of losses and replacements to work. There were occasions when this was the only method of estimation available to us; fortunately this was seldom the case.

In order to develop and use the above methods it was essential to maintain a detailed and comprehensive log-book of the activities of each of the enemy outfits we were facing, or were at all likely to encounter. Only by maintaining such a record was it possible to arrive at the various individual formulae applicable under certain conditions to an enemy unit, and to determine the general pattern of the latter's activities, on which to base more or less reasonable guesses involved in computing its strength.

It is obvious that if anyone were to undertake the task of estimating enemy strength along the lines described here, he must first become thoroughly familiar with the whole enemy tactical and strategic situation. He must have access to all intelligence originating not only from his own sector, but from other areas as well. He must be familiar with all phases of G-2 activities, and he must work as an integral part of the G-2 section to which he belongs.

Theater Replacement Systems of World War II

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This is the second of two articles on the subject of the Replacement System by Colonel Elver, and supplements the preceding one which was published in the July edition of the MILITARY REVIEW.—The Editor.

AT the outset of World War II there was no well defined plan for the handling of replacements within a theater of operations. The theater commander was responsible for the replacement support of his troops, but principles and procedures for the accomplishment of this mission had not been developed. In consequence, the early theater replacement system developed crudely without adequate planning and supervision. Even after the basic plan for organization and operation had been developed and prescribed in War Department directives, it was to be expected that the systems of the several theaters would vary somewhat in detail from one another. Circumstances of time, geography, the size and mission of the theater, as well as the desires of the different commanders, naturally dictated that the systems would assume different forms.

The Beginnings of the Replacement System

The first large replacement problems developed in the North African Theater, later to become the Mediterranean Theater. Because of the lack of opportunity for prior planning and the lack of experience in the operation of a replacement

system under combat conditions, the early phases of replacement administration in the theater developed serious difficulties. There was no central agency whose primary mission was the supervision and control of replacement activities. No adequate accounting or classification plan had been developed, with the result that replacements could not be assigned in accordance with their military occupational specialties, and were not utilized where they were most needed. Combat replacements were diverted for the formation of provisional service units. Service replacements were assigned to combat units to replace infantry casualties. Replacement installations were overcrowded with replacements who were being held for months. Plans for efficient utilization of manpower, particularly limited assignment personnel, were entirely lacking.

As a result of studies of the conditions in the theater, the War Department directed, in May 1944, the establishment of a centralized and uniform replacement system in each of the theaters, and announced the basic principles which should govern the operation of the system.

The Replacement and Training Command, Mediterranean Theater

The Replacement Command in the North African Theater was organized at Oran, Algeria, 1 June 1944. At this time, there were in operation four replacement depots, as well as other replacement units, scattered throughout the theater in Morocco,

Algeria, Sicily and Italy, all of which came under this new Replacement Command. Since the center of activity of the theater was now in Italy, almost immediately the headquarters was moved to Fagianeria, near Caserta, and gradually the depots were also moved to Italy.

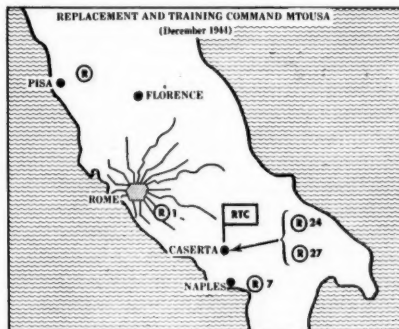
Partly due to the fact that many replacements previously used in the theater had been poorly assigned, and partly because more riflemen were needed than had been anticipated, there was an excess of service replacements and an acute shortage of infantry riflemen. Consequently, from the beginning, the Replacement Command was involved in an extensive retraining program for the purpose of converting men, formerly in other categories, to meet requirements for infantry riflemen and other classifications in which supply did not equal demand. The retraining program became such an important part of the operation that in February 1945 the command was redesignated the Replacement and Training Command. By VE-day it had trained approximately 15,000 riflemen and had conducted other conversion training and schools, including courses for mountain troops and armored forces, retraining of limited assignment personnel, and a small officers' candidate school.

The command had processed, in nearly a year of operation, about 320,000 replacements, with an average monthly flow of 46,000. Among its additional missions, the command processed repatriated American Air Force prisoners of war, conducted an experimental program of training dogs to detect mines, processed rotational personnel, operated a disciplinary training center and established the University Training Command for the educational program during the redeployment period.

Development of the Replacement System in ETO

In the European Theater of Operations, the Field Force Replacement System was originally made the responsibility of the

Commanding General of the Services of Supply, which was the forerunner of the communications zone. The system was first announced in orders of Headquarters, Services of Supply in November 1943 with the chief of the system functioning in the capacity of a replacement officer on the staff of the Services of Supply Commander. The period from the inception of the system until the invasion of the continent



was devoted primarily to the planning for the replacement support of Operation Overlord and subsequent continental operations, and to the establishment and build-up of the replacement installations and the replacement reserve which were to support these operations.

A few depots had arrived from the zone of interior, and others were activated within the system. The replacement stockage was built up within the United Kingdom. The 118th Infantry was the training regiment of the system with companies attached to the depots for the conduct of replacement training. By D-day there were approximately 86,000 replacements in the theater to support the forthcoming operation.

In April 1944, the initial planning and organization stage having been completed, and pre-invasion operations becoming increasingly important, the Field Force Replacement System was redesignated the Replacement System. By the time of the

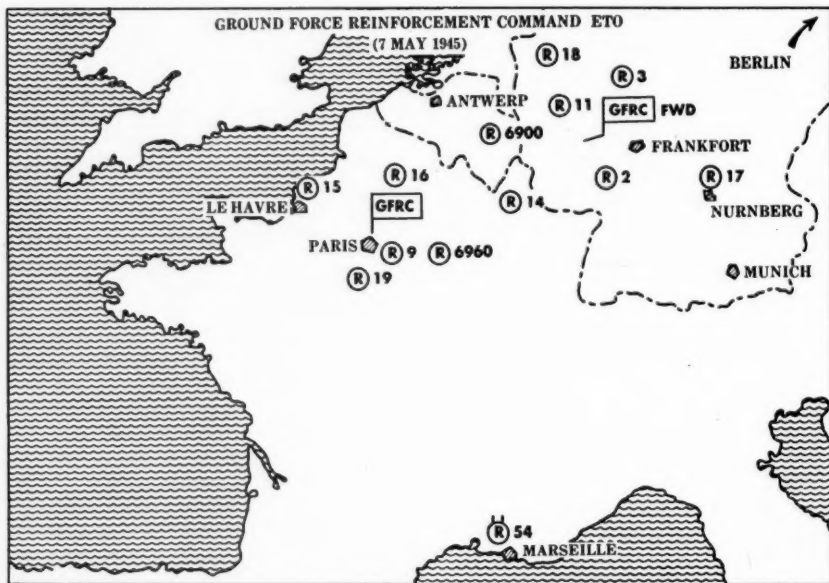
invasion the system had been reorganized in compliance with the War Department directive of May 1944 and had been renamed the Ground Force Replacement System. The Chief of the Replacement Section of Theater Headquarters was responsible to the Deputy Theater Commander who was also the Commanding General of the Communications Zone.

Operations on the Continent

Initial support of the invasion was provided by an authorized 2,500 man over-

vance echelon of the replacement system headquarters opened near the beaches to control replacement operations on the continent. The Third Army was supported by the 17th Replacement Depot, which arrived on the continent in July and took up its initial position at Barnville prior to the Third Army's jump-off.

As the invasion deepened and more space and facilities became available on the continent, the Ground Force Replacement Command, as it had been redesign-



strength to each of the assault divisions. The operation of the First Army was further supported by the 14th Replacement Depot, which was part of the assault echelon and landed on the continent between D+3 and D+9. A staging depot was established in the United Kingdom where replacements in packages of from 200 to 300 men, grouped by military occupational specialties, were held for shipment to the continent as required. An ad-

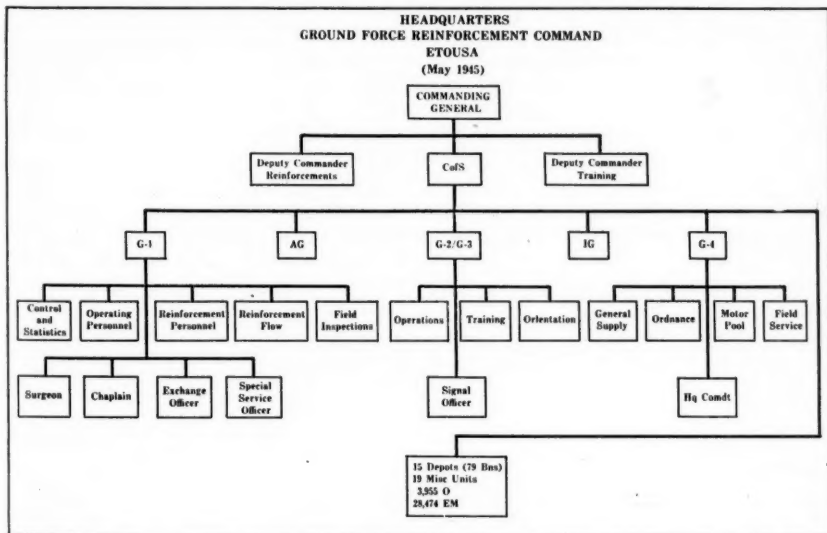
dated, continued moving its installations to the continent and expanding its operations. From this time on, its organization and operations were very much along the lines which are now considered typical of the completely developed theater replacement system. This was to be expected, since the operation in this theater was on a large land mass, and on a larger scale than any other military operation of our armies during the war.

In December 1944, as part of a program to improve replacement morale, General Eisenhower announced that the replacements in the theater constituted a combat reserve, and directed that they should be designated "reinforcements." Accordingly the Replacement Command was again renamed, this time as the Ground Force Reinforcement Command.

As the theater developed, so did the

Kingdom, replacement operations had to be continued there in order to receive this personnel and stage them back to the continent. On the continent, provision had to be made for their return to their units or for their reassignment, as well as similar provisions for those discharged from hospitals operating in France.

The shortage of manpower which was developing necessitated a conservation pro-



complexity of the replacement mission and replacement operations. Prior to D-day the entire operation had consisted of planning and building up the assault stockage. During the early days of the campaign, the job was the single one of replacing the losses among the assault troops. As the theater became older and more settled, an ever increasing group of hospital returnees were being received by the replacement command or returned to their units, and more and more limited assignment personnel required reassignment and retraining. Since over half of the hospital returnees were being discharged from hospitals in the United

Kingdom on a large scale. This involved the retraining and utilization of the limited assignment personnel in the theater, the extraction from service units and Air Force ground units of general assignment personnel suitable for combat duty, and the operation of a training program to convert them to infantry. At the same time a serious shortage in junior officers necessitated an officer procurement program.

As a result, the special training and retraining missions allotted to the Reinforcement Command constituted one of its major missions. On the continent, the mission of retraining enlisted men for

duty as infantrymen, which commenced with the retraining of an overstockage of headquarters, and service company personnel in July 1944, gradually increased so that on VE-day three reinforcement depots, each considerably augmented in reinforcement capacity and training staff, were engaged in retraining general service men, selected from Service and Air Force units, for infantry combat duty.

About 40,000 men were being retrained in each six-weeks course. One other depot, also greatly augmented by an added training staff, was operating an officers' training center for retraining service force officers for combat duty, refresher training of officers who had received battlefield commissions, and conducting an officer candidate school. Its total output of the three categories was about 3,600 per month.

By VE-day, the Reinforcement Command had developed a fairly complete system and achieved considerable efficiency through specialization of the missions of the fifteen depots and one separate battalion then in operation.

In November 1944, the Reinforcement Command had been given the additional mission of processing rotational personnel to the zone of the interior during the remainder of the combat phase. This was at first only a minor additional mission, but with the cessation of hostilities the immediate objective of the theater became redeployment of personnel to the Pacific Theater, usually through the zone of the interior. The entire Reinforcement Command went in reverse, so to speak, and became the major theater agency for the return of individuals from the theater. As the redeployment program continued, and the theater became more stable, the replacement mission was virtually accomplished. Depots were gradually inactivated or redeployed and finally the command itself was dissolved.

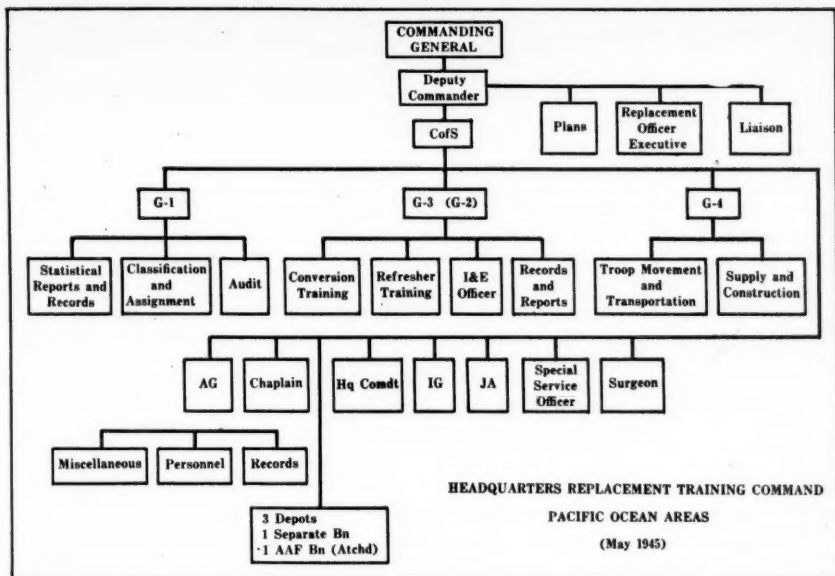
Replacement System in the Pacific

In the Pacific, two replacement commands were established in the summer of 1944. In the Pacific Ocean Area (POA) the Replacement Training Command was a major theater command, as it was in the Southwest Pacific Area (SWPA), where the Replacement Command, USAFFE, was established. When the theaters were reorganized in July 1945, the POA Replacement Training Command continued its mission with U.S. Army Forces in the Middle Pacific (AFMIDPAC), while the SWPA Replacement Command passed to the control of the U.S. Army Forces of the Western Pacific (AFWESPAC).

In these theaters, replacement supply from the zone of the interior was always critically short, and logistical factors, particularly water transportation, presented a major problem. Replacement planning required an attempt to anticipate where replacements would be needed and to forward them from the zone of interior directly to the island where they could be most effectively used. However, the necessity of fitting replacements to existing shipping space frequently required transshipment within the theater.

In POA the time lag between requisitioning replacements and their arrival in Hawaii averaged three months. Thirty days might be lost awaiting further shipping, during which the replacements received processing and theater training.

Another twenty days were consumed en route to a forward depot or transfer area. A ten day wait might be expected for further transportation, during which replacements could be processed and conditioned. Finally, another ten-day ocean voyage was required to bring the replacements to the island where combat reinforcement was needed. In all, nearly six months was the time length of the pipe line. These long voyages made reconditioning and theater training a very important function of the replacement command.



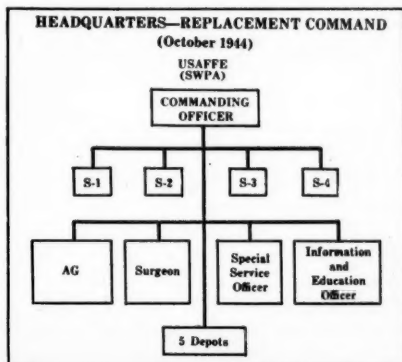
In both theaters the dispersion of units and installations on a few islands in the vast expanse of water made the assignment of specialized missions to depots impossible. Each depot performed all missions required for the support of the area in which it was located. Thus we find depots acting as receiving, training and stockage units, processing hospital returnees and forwarding replacements to units as required.

Replacement support of early operations was provided by the shipment of replacements from the depots in New Guinea and Australia to the combat forces, as directed by theater headquarters. The replacement support of the Leyte operation in October 1944 was provided by attaching the 4th Replacement Depot to Sixth Army. The depot went in with the assault echelon and was ashore by D+4.

Replacement Support for XXIV Corps

This operation presented a difficult replacement problem to both the SWPA

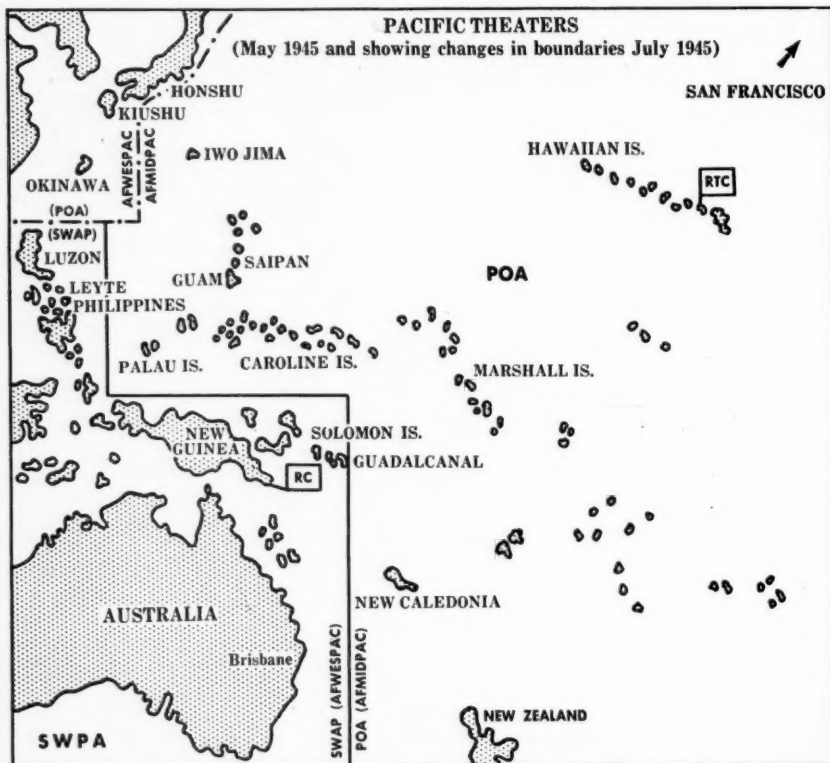
Replacement Command and the POA Replacement Training Command. The XXIV Corps, which was assigned to POA, was attached operationally to Sixth Army for the Leyte campaign. SWPA was responsible for the replacement support during the combat phase, while POA was charged with the rehabilitation of the Corps in preparation for the forthcoming Okinawa



operation. The Corps remained in combat in Leyte from October until early February with heavy losses. SWPA, however, was critically short of replacements and was unable to supply the requirements of the Corps. POA in November, diverted 2,000 replacements in the 6th Replacement

the Corps in making rapid and appropriate assignments on arrival.

No further replacements were available in either theater until practically the end of the Corps' operation in Leyte in the latter part of January, when POA diverted an additional 1,500 replacements to it.



Depot, intended for other units, to the XXIV Corps on Leyte. By agreement between the two replacement commands and the Corps, the 4th Replacement Depot was used as a transfer point. Since a large part of these replacements were not infantrymen, a classification team accompanied the shipment, conducted classification processing aboard ship, and assisted

In spite of all efforts to secure sufficient replacements, the rehabilitation of the Corps could not be completely accomplished, with the result that it entered the Okinawa operation with each of its divisions approximately 1,000 men understrength.

Pacific Operations After VE-day

The close of hostilities in the European

Theater relieved to some extent the problem of replacement supply, since now all of the replacements in the zone of interior could be sent to the Pacific theaters. Also some of the replacement installations operating in the European Theater were scheduled for transfer to the Pacific. Actually, only one redeployed depot, the 11th, had arrived in the Philippines by VJ-day.

In the meantime, replacement activities in the AFMIDPAC decreased while the requirements in AFWESPAC continued. The Replacement Command of SWPA became the AFWESPAC Replacement Command and moved from New Guinea to the Philippines to provide closer support for current and planned operations. After VJ-day, the 4th Replacement Depot, then attached to the Eighth Army, and the 11th Replacement Depot, then attached to the Sixth Army, moved into Japan under their respective army commands.

In AFWESPAC, as had been the case in Europe, the major effect of the Replacement Command, from this time on, was the returning to the zone of the interior of personnel scheduled for redeployment. In AFMIDPAC, however, separate installations were established for the purpose of handling rotational and demobilization personnel, rather than processing them through the Replacement Training Command.

Air Force Replacement Systems

The replacement support of Air Force units varied in the different theaters. In the European Theater the replacement officer on the theater staff was responsible for coordination, at theater level, of plans for both air and ground replacements. He was also commander of the Ground Force Reinforcement Command. The air force replacement depots operated under the Theater Air Force, completely independent of the ground force system. In the Mediterranean Theater, the air force replacement battalion for ground crews was under control of the Replacement and

Training Command, while air crews were replaced through air force channels. In the Pacific both these systems were employed. In POA, a replacement battalion for air force ground personnel was attached administratively to the Replacement Training Command but received its assignment directives from the Air Force. Air crews were replaced through air force channels. In SWPA the entire air force replacement system operated independently of the Replacement Command.

Upon examination of the operations of the various replacement commands during the war we find some problems which were common in their operations, and some distinct differences in methods of operation resulting from the different conditions under which the campaigns were carried out. From these common problems which appear to be inherent in all replacement systems, we can draw some general principles and some common ideas. Thus, we find in all theaters, our first problem is the necessity for providing a centralized replacement command for the coordination and control of replacements throughout the theaters. Long range planning to meet replacement requirements, and close coordination between the theaters and the zone of interior are essential to adequate replacement support.

Conservation and maximum utilization of manpower dictates that in any replacement system a reconditioning and retraining program must be an essential part of the theater replacement system. Efficient utilization of personnel returning from the hospital is of prime importance, and the experience in all theaters indicates the wisdom of segregation of hospitalized personnel from replacements to provide special processing, efficient classification and maintenance of morale of both classes.

The differences in operation in the different theaters point out the necessity for flexibility in our replacement planning and operations. It is somewhat easier to

plan a replacement system to operate in a theater on one continent, with a well-defined communications zone, where as operations continue, transportation facilities are constantly being improved and speeded up; and it is quite another to attempt to attain the same objectives over thousands of miles of water to small is-

lands containing relatively small combat forces. Consequently, we must understand and develop the basic principles underlying the replacement system which will be our guide in all cases, and recognize that our operational methods must be varied to suit the situation with which we are confronted.

The many branches and installations of the War Department which were concerned with troop movements, and the many details which had to be carried out in connection with each phase, left many opportunities for errors of omission, as well as commission, in preparing the units and forwarding them to the ports. Early in the war steps were taken to formulate standard procedures, which would clearly establish and define all responsibilities. This led to the publication of a pamphlet entitled, *Preparation for Overseas Movement* (POM), additional instructions regarding the preparation of Army Air Forces units (AIR-POM), and a complementary pamphlet entitled *Identification of Organizational Impedimenta* (IOI). These instructions appreciably reduced the task which fell upon the port commanders with regard to troops passing through their installations, but the responsibility remained a heavy one.

Report of the Chief of Transportation

Development of the **Modern Convoy System**

Rear Admiral M. R. Browning, *United States Navy (Retired)*

SINCE earliest recorded history, the sea lanes traversing the surface of the oceans of the world have provided the main arteries of intercontinental traffic. Always, ships have constituted in the past, and will continue to constitute in the future, the primary vehicles in which this traffic is hauled. True, the years ahead will probably witness progressively greater encroachment by air transport upon the former monopoly of the shipping lines in overseas passenger travel, but the waterborne cargo vessel will never be displaced by aircraft, or any other form of mobile container from its established position at the head of the list of man's over water commodity carriers.

This all-important role of the ocean going vessel—and particularly the ocean going cargo vessel—in the complex pattern of the economic activities of the human race increases vastly in significance during periods of international warfare. It is during such periods that the vital commodity requirements of all nations, and especially those of the belligerents, are multiplied many times in bulk and urgency. It is also at these times that demands for outgoing shipping space for the processed sinews of war become a major drain upon the supply of bottoms available to a belligerent nation. Coincident with this demand, such a nation feels the inevitable pressure of war upon its entire home industrial plant; a pressure which effectively

precludes the devotion of the full national building capacity to the task of producing more bottoms. These factors, combined with the accompanying enormously increased rate of shipping losses at sea, both from enemy action and from natural causes, bring into being a fundamental relationship which may be stated as an axiom. It is this: *In modern warfare on a major scale, available shipping is the keystone in the arch of a nation's war potential; without an adequate merchant marine, neither offense nor defense can be activated and maintained at a potent level.*

Maritime powers have long recognized this vital importance of their merchant shipping in war. One outstanding result of this recognition has been the devotion of strenuous effort on their part to protect their merchant marine from enemy attack; an effort which has featured the conduct of overseas trade in times of international stress ever since the expanding horizons of the known world first brought that trade into existence. Of all the protective schemes which have been devised to this end, the convoy has proved to be the most uniformly successful and has been the most widely used. Despite its many drawbacks—some very real and some only fancied—the convoy affords the best known single answer to the threats of the surface raider, to the submarine oper-

ating either singly or in packs, and to the aerial bomb or torpedo.

The precise origin of the idea of the convoy is hidden in the gloom of ancient history. We know that it was practiced in primitive form, designed primarily to meet the danger of pirates, in both the Mediterranean Sea and in the coastal waters and river mouths of China before the beginning of the Christian era. The first convoy operations of which we have adequate and specific record, however, were those of the Venetians in the Twelfth Century, A.D., in their efforts to reduce the toll taken from their commerce by the corsair raids launched from the buccaneer bases which infested the North African coast at that time. In their operations of that period, the Venetians developed and applied, in clear cut form, the three basic features of true convoy, viz; ship grouping for a passage, armed escort and planned routing. These three principles remain unaltered to this day; in both World Wars which have marked the present century, they have constituted the main elements of the framework of the convoy system upon which the vast and world-wide ocean traffic of the United States and the Allied Powers has depended.

In the total war of modern times, however, the problem of escort and protection of sea commerce is no longer the simple one which confronted the Venetians eight hundred years ago. Then, they were concerned only with guarding a few merchantmen from isolated and sporadic surface raids, and their critical sea lanes were confined to the Mediterranean Sea. Today, the belligerent power is vitally concerned in every line of transportation and supply in every corner of the oceans. All sea lanes are critical routes for the nation at war. Attack by surface raiders is no longer the only—nor even the major—danger; the submarine, the aircraft, the guided missile, the mine of every kind,

all have joined the formidable catalogue of the menaces to modern shipping, day and night, throughout every hour of every voyage and in every part of the world.

Any nation which can thus endanger the interchange of supplies and materials by sea, has thereby already achieved a strategic victory of immense import over an enemy power. It can—and it invariably does—by wielding this threat against the hostile life lines, force upon its opponent the employment of one or more of the four means which exist to protect shipping. These are: (1) convoy, (2) lane or area patrol, (3) employment of covering forces, (4) acquisition of intermediate bases.

Of the four, the first, convoy, is the most effective in almost every situation. It is particularly useful in sets of conditions where long sea lanes traverse wide stretches of open water and supporting bases are widely separated. The last three are methods of establishing limited or temporary control over the area or lane in question. In practice, belligerent sea traffic is almost invariably guarded by the combination of convoy coordinated with one or more of the other three forms of protection. Since there is no such thing today as control so absolute over any ocean area or lane as to preclude positively the possibility of enemy penetration and attack in some form, it follows that a nation at war must employ protection in some measure wherever its ships are required to go. As has been previously observed, in modern warfare, that means protection in every navigable corner of every ocean on the face of the earth. It is a very expensive task to provide such protection—expensive in men, money, time and vital equipment—and it is due to this fact that an enemy's potentiality to attack the shipping becomes, *per se*, a strategic victory of the first magnitude for him. A belligerent, to provide any one of the four forms of pro-

tection, must face the pre-requisite, therefore, of diverting important military strength from other efforts. For the use of convoy, in addition, he must accept the serious disadvantages of detention of vessels to permit assembly before departure on the voyage, reduction in speed of passage to accomodate the slowest ship, roundabout routing and evasive course changes, delays in discharging and in loading cargo incident to crowded ports, etc.

There has always been a considerable amount of articulate opposition to the convoy principle in the past, and some of it continues down to the present day. Arguments against it, however, when fully and dispassionately analysed, are invariably disclosed to have originated with commercial shipping interests which have failed to embrace all the factors involved in their purview, and which base their aversion to the system on considerations which are peculiar to their own operating experience and to the characteristics of the vessels owned or chartered by them. There can be no question from a worldwide standpoint but that the convoy, throughout its history, and particularly since the advent of the submarine and airplane, has demonstrated its pre-eminent effectiveness for wartime merchant ship protection.

During World War I, Great Britain was brought close to the door of defeat by the German U-boat campaign in the Atlantic. In the fall of 1916, the British Admiralty, desperate in the face of staggering and steadily mounting losses, proposed the general adoption of the convoy system as a means to avert disaster. Commercial shipping interests in Britain opposed the move energetically and with success, on the ground that the institution of such a practice would cost more in delays and confusion than it could be hoped to offset by increased security. By April of the following year, however, the German un-

dersea forces had so far gained the upper hand that the Empire was truly in difficulties with only six weeks' supply of food left in all the British Isles. Again, the Admiralty put forth insistent demands that convoy be instituted and, this time, fortunately for the cause of the democratic nations, it was acceded to as a last resort. The next month, May 1917, the first large convoy of modern times was accordingly assembled at Gibraltar and conducted from there to England through the most dangerously infested stretch of water that existed at that time. The voyage was made without loss or any untoward incident; an achievement which, while remarkable enough in itself as evidence of the ability of adequate escort to keep off submarines, was of even greater import, because it gave convincing rebuttal to the claims of the opponents of the system that it was not feasible to maneuver large numbers of non-homogeneous merchant ships in close formation, and to hold them together and make good progress along a given route. After this successful inauguration, the system was extended at once to all critical lanes and areas, with successful overall results. Speaking of 20 May, 1917, the date on which that first Gibraltar convoy entered its port of destination in the British Isles, the Commander of U.S. Naval Forces in European waters commented "it marks one of the great turning points of the war."

Marked as was the improvement in the British strategic position as a result of the introduction of convoy, the system in its then state of development was by no means an unqualified success from the outset. The first Gibraltar-to-England transit had made a perfect record; but there were many subsequent operations in all parts of the world which were not so successful. Heavy losses were sustained from time to time; some to torpedo attack directly, and others to factors inher-

ent in the convoy doctrine as it existed. The necessity for compressing large numbers of undisciplined and nondescript vessels into the close formations which were indispensable to permit effective screening, mutual support and day and night zigzag, involved extremely high collision risks. Similarly, the doctrine requiring simultaneous sharp turnaway and immediate full speed, together with dispersal, when under submarine attack, made costly crashes inevitable. Many cargoes were lost and many escort ships were damaged or cut in half and sunk as a result of these bad features of the system. Despite all such drawbacks, however, and notwithstanding numerous cases of ineptitude and poor planning in the early months, the adoption of the convoy unquestionably saved the cause of the British Empire and that of the Allied Nations. The record, at the end of the war in November 1918, showed that, of vessels in ocean convoy, less than one per cent were lost to enemy attack, while, of those in convoy in coastal sea lanes, an even smaller percentage fell prey to the U-boat.

These operations in 1917 and 1918 served to clarify the new problems in protection of shipping which had been introduced by the invention of the submarine. In this particular field, U.S. and British experience gained in World War I constituted a priceless laboratory for development of the improved system of convoy which was to serve us so well in World War II. The earlier war, however, did not bring into the open the menace of air attack; a danger which burst full-grown and deadly upon the United Nations sea lanes at the very beginning of the World War II. It was this new and potent factor in the situation, together with the appearance of "wolf pack" tactics on the part of the U-boats, which rendered many of the features of the 1918 system useless in 1941 and 1942, and

forced sweeping modifications in the principles of convoy organization and tactics before the vital ratio of ship losses versus ship replacement could be painstakingly forged into a favorable one for the United States and our allies.

The story of the evolution of the enormous network of controls and the intricate patterns of communications and traffic direction which covered the entire navigable surface of the globe in the war just ended, provides an absorbing and instructive chapter in the endless drama of change and adaption in mankind's methods of defense to counter new forms and techniques of attack which are devised by his fellows. The voyage history of an HX or an SC convoy from the eastern coast of North America to a port in the United Kingdom in the late war bears little resemblance to the report of the Commodore, in May 1917, of the first British experiment of modern times, and even less likeness to the diaries of those Venetian ship masters of the Twelfth Century. Yet all three of those documents are alike in that they each constitute a link in an unbroken chain of evidence to prove that the convoy is the best of all known protective measures for shipping; sound in principle, effective in practice and here to stay. If another war is visited upon us in the future, American men and ships and munitions will move along the surface sea lanes of the world in convoy. Those convoys of the future may exhibit many features never before seen; atomic attack and whatever other new and fantastic development of offense may compel drastic changes in our present concepts of the system; but our overseas traffic must still be under escort and in convoy, if it is to survive in wartime, and the convoy system will still be the binding cement which holds our merchant marine firmly in its place as the keystone in the arch of our war potential.

Command Responsibility *for* Adequate Dental Service

Lieutenant Colonel G. F. Jeffcott, *Dental Corps*
Historical Division, Army Medical Library

TACTICAL commanders quite properly evaluate any function or service in the light of its ability to help the organization win battles. Judged on this basis, the dental service is often regarded as a luxury; it is desirable as a humanitarian activity which relieves the soldier's toothache, but when the chips are down, the dental officer and his assistant are no substitute for another mortar squad or a light tank. It is easy to forget that while humanitarian considerations are important they had little to do with the decision to establish a dental service in the U.S. Army. The first objective of the Dental Corps is to keep fighting men available for action, and the commander who consistently neglects the dental health of his troops may expect a direct and cumulative loss of combat effectiveness.

Much to its chagrin, the German Army provided an early demonstration of the relation between adequate dental care and striking power in the field. In planning for World War II the Germans were facing a desperate enterprise in which they were prepared to sacrifice any people, including their own, for victory. With limited resources they had to make the most economical use of every man and every bit of equipment. Basing its decision on strictly materialistic considerations, and expecting that the war would be short in any event, the German General Staff decided to dispense with an organized Dental Corps. Within approxi-

mately one year, losses of manpower from accumulating dental defects became so serious that the earlier policy was hastily revised and German troops were thereafter provided dental care only slightly less complete than that which was later supplied American soldiers. The German General Staff had finally realized that the anonymous soldier with a dental infection, or a stomach disorder caused by lack of teeth, was also the driver of a tank or the pilot of a plane.

American and Allied experience later corroborated the findings of the German forces. It is common knowledge that Americans between the ages of six and twenty years receive less than one-fourth of the dental care they need each year. Inductees generally show the effects of years of dental neglect and many of them will already have suffered extensive damage to the teeth and oral structures when they enter military service. The Dental Corps can eliminate old infections and restore a reasonable measure of function, but these cases are like old cars patched up after an accident; unless they receive regular, skilled attention, serious trouble may be expected at some later date.

Troops newly arrived overseas in World War II were generally in good dental condition and evacuations for dental defects were not at first an urgent problem. As the war progressed, however, some evacuation hospitals reported that large numbers of men were being sent out of for-

ward areas for the treatment of dental ills which they thought could have been prevented or treated within the command. There were reports that some dental officers had also been acting as mess officers or assisting the surgeons. Under some circumstances these patients were lost to their units for many days or weeks. Hospitals in the forward areas were choked with wounded, and any patient not requiring immediate care to save his life was sent back to a less crowded installation. A soldier sent to an evacuation hospital in Sicily for the repair of a denture arrived in North Africa before he reached a hospital which had sufficient time to render the simple but essential treatment he needed. The resulting loss of manpower became a matter of serious concern to commanders.

Commanders also found that the ability to get prompt dental attention had a surprising effect on morale. During the North African campaign, for instance, the establishment of dental laboratories was unavoidably delayed, and a backlog of patients needing dental replacements accumulated at a rapid rate. The problem received very little attention outside the Medical Department until the Commanding General directed censors to tabulate the "gripes" found in military mail. Unfortunately, the dental service won the contest without serious competition! Soldiers were much more vocal about the difficulties in obtaining dental care than they were about the dangers and discomforts of combat or the disadvantages of canned meat and dried eggs. As a result of these observations, commanders began to take a new interest in the operation of the dental service.

What can an alert commander do to insure the best possible dental care for his men?

His first concern should be to make it possible for his dental officers to operate steadily, day after day, with the least

possible interruption. Without exception, an idle dental officer, or a dental officer performing non-dental functions, is a danger signal requiring immediate investigation and vigorous action to prevent early deterioration of the dental health of the command. In the large camps of the Zone of the Interior, one dentist may be responsible for only 300 men; in tactical units he will have an average of 1,200 patients. He can render reasonably adequate care for such a large number of men only if he devotes all of his time to the job.

Under the organization of the dental service prior to World War II it was often impossible for a dentist to render dental care for long periods at a time. Dentists were usually assigned to individual small units, and when the command went into action the dental surgeon was patently unable to perform his proper duties. He, therefore, assisted the surgeon or assumed non-professional tasks. When the unit went to a rest area the dentist needed relaxation almost as badly as the other troops. In either situation very little dental work was done. As units were in and out of combat for month after month during World War II, it became increasingly apparent that some better means had to be found for utilizing limited dental facilities. In some divisions dental officers were removed from the smaller units and placed under centralized control where they could perform their proper duties. When a regiment went into action it gave up one or both of its dentists for duty with other organizations, but when it entered a rest area five or more dental officers and their equipment would be waiting to clean up all defects in as short a time as possible. It is probable that some similar plan will be official in any future emergency. The development of mobile operating trucks also made it possible for dental officers to work efficiently a short distance from the

combat area. In any event, it is no longer necessary or desirable for a dental officer to neglect his responsibility for the dental care of the troops while he acts as an auxiliary medical officer or administrative officer. If dentists are not working eight hours a day on patients, with few days lost for moves or outside duties, some correction of the dental plan is imperative. It may be necessary for commanders voluntarily to surrender some of their control over dentists in the interest of greater long-term efficiency. A battalion commander, for instance, may object to giving up his dental officer when the unit goes into combat where routine dental treatment cannot be carried out; yet the battalion will benefit in the long run if it will in turn, be assigned two dental officers during any period when it is in a rest area. Dental staff officers will be ready to advise and assist if the problem cannot be solved within the unit.

Commanders should also give every reasonable support to dental surgeons in the matter of enforcing dental appointments. Some company commanders who would take prompt disciplinary action if a work detail failed to report at a designated time will thoughtlessly direct a soldier to pay no attention to a dental appointment if the man is needed for some other routine duty. Such action is unfair to the soldier, because he will probably fail to get needed care; it is unfair to the dental officer because he can do effective work for only about eight men a day and he cannot discharge his obligation to the unit if several hours are lost for broken appointments. Above all the total amount of time lost for dental treatment will be much increased if the appointment system is allowed to break down. If the dentist can be sure that his patients will be available when needed, he will estimate the time required for each case and schedule each patient for an hour when he can be seen with mini-

mum delay. If the proportion of broken appointments becomes too high, however, the dental officer must schedule several men for each vacant period in order to insure that he will have at least one patient. If all fail to appear he will still be idle; if all report, only one can receive treatment and the time of the others will have been wasted. It is to the best interests of all concerned if patients and subordinate commanders understand that soldiers have the same obligation to keep a dental appointment as to attend any other official formation. In many units dental appointments are sent out through headquarters and carry the authority of an order of the commanding officer.

Commanders should insure that the recommendations of dental staff officers of their own and higher commands receive careful consideration. Since the dental surgeon himself does not have access to the commanding officer, these recommendations will normally be presented "second hand" by the surgeon; they will often be proposed with less enthusiasm and persuasion than if they had been presented by the person most directly concerned. The commander should show by his attitude that he is personally interested in the efficient operation of the dental service and that it is his desire that all proposals for its improvement receive more than perfunctory attention. It is especially important that the commanders of smaller units utilize the recommendations of dental staff officers from higher headquarters. Most junior dental officers come directly from civilian life, and though they are well qualified professionally, they may lack military experience. Only one-quarter of the dental officers assigned to organizations in World War II had as much as one month of formal military training, and many surgeons had even less knowledge of the proper administration of the dental service. It is, therefore, good policy to ask for advice from

more senior officers if unusual problems are encountered, or if there is reason to doubt the effectiveness of the dental care given the command.

Wartime experience has shown that the efficiency of the dental service will be reflected in the health and morale of the troops and in the availability of man-

power in times of stress. Operation of the dental service, therefore, becomes a matter for the personal attention of commanding officers. Progressive commanders will find that steps to improve the dental health of their men will pay important dividends where they count the most, on the field of battle.

In its observations in the American, British and French zones in Germany, the U.S. Strategic Bombing Survey found no evidence of any Allied effort to break the health of the German people; however, the bombing razed medical facilities where they were near military objectives and created conditions which interfered with the maintenance of good health. The effect of total war, and more particularly the results of aerial bombing, contributed largely to the increase of diseases of the mind and body of the German people. Pneumonia and influenza deaths increased during the periods after air attacks. The great shortage of doctors for the civilian population was met, in part, by the graduation of women doctors, the classification, for the purpose of allocation and distribution, of physicians more than seventy years of age as "half doctors," and in the summer of 1944 the reinstatement of all Jewish doctors to full medical practice.

A definite relation existed between the kind of bomb dropped and the type of death which could be expected. Incendiary bombs killed more than they wounded, through intense heat and carbon monoxide. High explosive bombings caused a greater number of so-called mechanical injuries than deaths. On the whole, a considerably lower incidence of psychologically related physical ailments than might be expected were found. There was no accounting for this relative psychologic stability of the population, although propaganda indoctrination might have been a factor.

There was no report of a patient being injured or killed in a hospital shelter in Germany, although some were directly hit. It was found, however, that confinement in the shelters often had a harmful effect on the recovery of patients. Heavy damage was inflicted by strategic bombing of the water supply and sewerage system. Water mains and sewer pipes twenty feet below the surface were ripped open by heavy bombs. The unsanitary conditions thus created were kept under control surprisingly well, but would have caused disease to become rampant had Germany not collapsed when she did.

The Bulletin of the U.S. Army Medical Department

Procurement for War

Lieutenant Colonel L. J. Fuller, *Corps of Engineers*
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SHOULD this country become involved in another war at the start we will be faced, aside from the immediate tactical situation, with two difficult problems: the procurement of trained soldiers and the procurement of matériel. The problem of matériel procurement that will face us will be considerably aggravated if the enemy adopts the sensible plan of attacking us before he does any other nation in order to impede or retard our preparation. The problem will be aggravated still further if he begins the war by a surprise bombardment with rockets and guided missiles of all our centers of production. Matériel procurement is one phase of industrial mobilization, and is the connecting link between industrial production and military supply.

Let us consider the basic problems in procurement both on the planning level, where supply and demand are determined and brought into balance, and on the operating level where the problems are those of negotiating contracts, contract administration, and contract terminations. Let us examine the system set up during World War II to solve them, including an examination of the field agencies for procurement and the principles under which they operated. And finally, let us estimate how changing conditions in the future may affect these problems.

Problems of the Planning Agencies

The problems of planning are essential-

ly three: the determining of requirements, the assignment of procurement responsibility for each item to a particular operating agency, and the allocation of critical raw materials to industry.

The Allocation of Critical Materials.—The problem of allocation is basically as

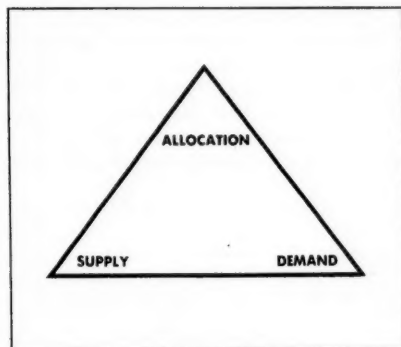


Figure 1.

shown in Figure 1. Demand having been determined, that is, total requirements of all items being known, the available supply must be surveyed, including finished items, available raw materials, imports, and manufacturing facilities. At first, for many items, possibly for all, demand will exceed supply, which means that in the planning stage provisions must be made to apportion the available supply among the different demands. This apportioning in World War II took place

on several successive echelons. First, on the international level (Figure 2), the Allied Nations, being given missions by the Combined Chiefs of Staff, determined their requirements and presented them to

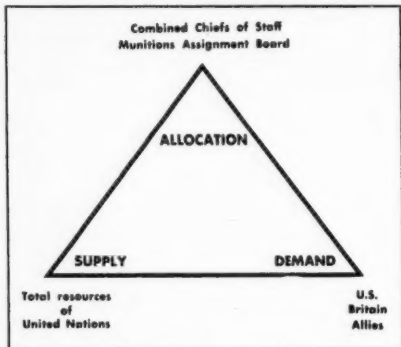


Figure 2.

the Munitions Assignment Board for approval, and for allocation of materials from the total resources of the United Nations. If we have allies again, or if we act within the framework of the United Nations, some such agency will again be necessary on the international level.

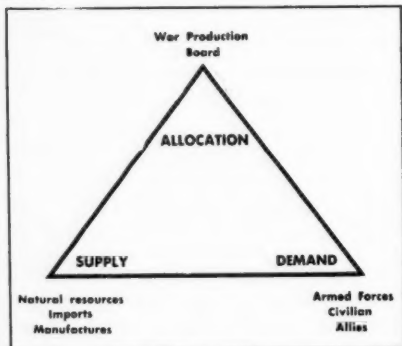


Figure 3.

Next, on the national level (Figure 3), it was the War Production Board which determined distribution of our resources and our production between the demands

of the armed forces on one hand, and the needs of our civilian economy on the other. Again, such an agency on the national level will be necessary in the future. It is notable here that our national

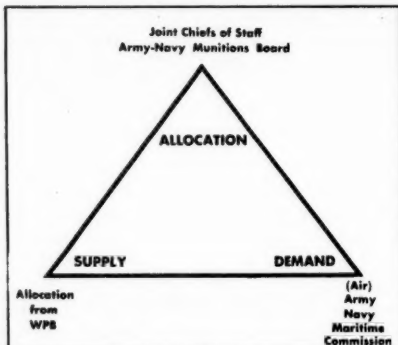


Figure 4.

policy provides a civilian board to resolve conflicting military and civilian demands.

On the Armed Services level (Figure 4), the Army-Navy Munitions Board reallocated that supply provided by the War Production Board in such a way among the Army, the Navy, and the Maritime

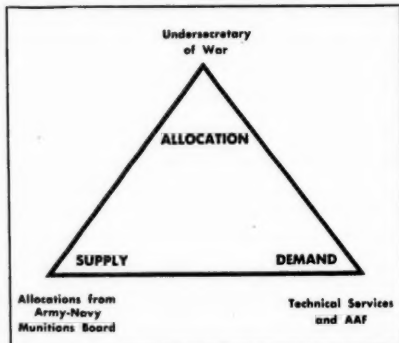


Figure 5.

Commission that these agencies could meet the operational directives of the Joint Chiefs of Staff. If in the future, Air is placed on this level, it can be elim-

inated from its present lower level.

On the War Department level (Figure 5), materials allocated to the Army had to be allocated to the actual procurement agencies so that they could make them available to manufacturers. Here, the office of the Undersecretary of War, to which was delegated all procurement responsibility for the war Department,

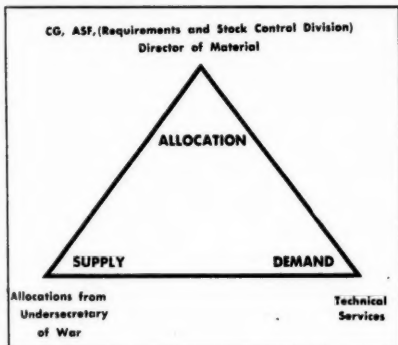


Figure 6.

made allocations to the Army Air Forces and to the technical services in proportion to their needs. This step would be eliminated if Air were on a level with Army and Navy.

Then, finally, at the Army Service Forces level (Figure 6), the Commanding General ASF, who was responsible for all procurement other than that peculiar to the AAF, reallocated ASF's share of the supplies, through his Director of Material, to each of the technical services which were his operating agencies. In the future it would appear that this step may be taken in the office of the Director of Services, Supply, and Procurement, War Department General Staff.

There is also the possibility that upon unification of the Armed Forces the lower three levels can be combined into one, under an Assistant Secretary of National Defense for Procurement and Industrial

Mobilization, and through a Director of Common Supply for all the services.

The Determination of Quantities Required.—The second problem during the planning is the determining of how much of each item of military supply will be required. In meeting this problem during the last war, procurement within the ASF passed through two phases; an emergency phase and a routine phase.

During the emergency phase, requirements increased tremendously, estimates were not accurate, and experience tables were worthless. Industry was not geared to produce a balanced military supply nor were all sources of supply being properly utilized. During this phase, all procurement was placed in the hands of the Director of Material whose office was organized substantially as shown in Figure 7. The determination of quantities required was coordinated in the Require-

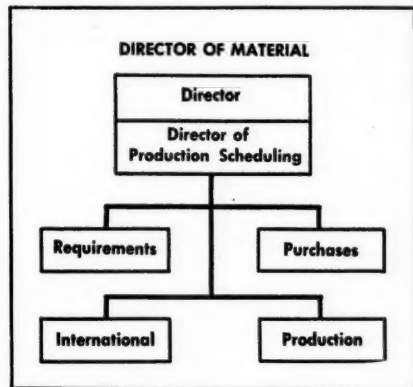


Figure 7.

ments Division which, working in close coordination with the Technical Services, consolidated the requirements of overseas theaters, those of the Zone of Interior, those of our Allies under lend-lease, as well as the requirements for those items which we supplied the Navy. The result was published in the Army

Supply Program which appeared quarterly, and established procurement objectives. To achieve this coordination, the Requirements Division maintained close liaison with the Operations and Plans Division, War Department General Staff; with the

War Production Board; and with the National Council for Research and Development.

There was a Purchase Division which prepared regulations for contracting and supervised the technical services in the placing of contracts. The Production Division supervised production scheduling by the technical services to insure that priority items were scheduled in phase with needs, and assisted the technical services with production difficulties. The International Air Division coordinated lend-lease requirements.

This organization continued throughout the emergency phase. In March 1943 this phase was over, procurement was becoming routine, and ample equipment and supplies were being provided. Requirements were now based on long-range forecasts. Industry was completely converted to wartime production and was turning out a

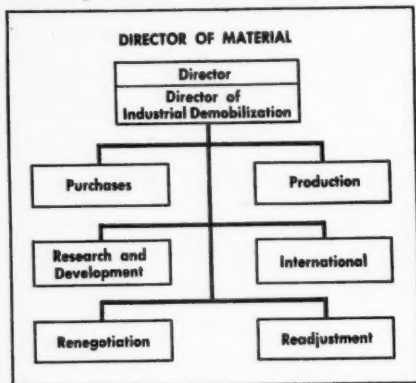


Figure 8.

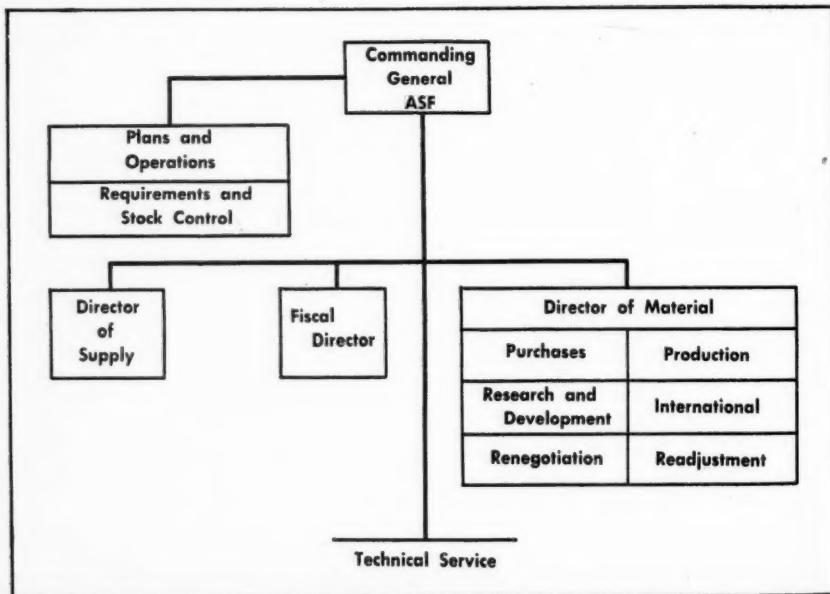


Figure 9.

more nearly balanced supply, phased with operational requirements.

Upon procurement's becoming routine, the determination of requirements passed out of the hands of the Director of Material and his office was reorganized as shown in Figure 8. Two new divisions were added to supervise contract administration and contract termination but there was no longer a Requirements Division.

The Requirements Division was placed under the Director of Plans and Operations, ASF (Figure 9), and operated the new Supply Control System which determined requirements with greater accuracy than formerly. During the routine phase, then, it was still the Requirements Division which determined the exact quantity of every item that had to be procured, and which published its findings to the procuring services, this time in the form of Monthly Progress Reports.

So much for the ASF. The Undersecretary of War delegated to the CG AAF, the responsibility for the procurement of all items peculiar to the Air Forces, and he in turn placed general supervision of air forces procurement in the hands of the Assistant Chief of the Air Staff-4, Matériel and Services, whose office contained the divisions which were concerned with procurement (Figure 10).

The Plans and Policies Division determined all requirements, and supervised production scheduling, keeping close liaison with A-3 and A-5 in determining requirements.

The Production Division supervised the ATSC (Air Technical Service Command) in research and development, in production problems and in obtaining priority materials for manufacturers.

The Contracts Division supervises the ATSC in all purchasing and contracting including local purchasing. The Readjustment Division supervises the ATSC in the settlement of terminated contracts

and in the disposal of government property.

The AAF at the beginning, had to create an entirely new industry to meet war needs in aircraft and their accessories and like the ASF it took several years for procurement to become routine.

The Assignment of Procurement Responsibility.—The third problem of the planning phase is to determine for each item of military supply, the one agency that will procure it to meet the entire

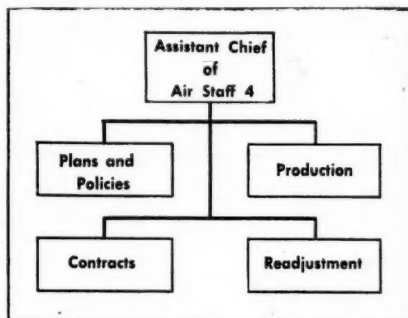


Figure 10.

Army's need. This third job was done by the Procurement Assignment Board, which, working on the War Department level assigned, where practicable, each article to one technical service for procurement, or, more exactly, published, for each item, a directive stating which technical service would draw up specifications, which would determine requirements, which provide funds, which purchase, which inspect, and which would store and issue. As an example, for the item, diesel oil, the Procurement Assignment Board gave to the Ordnance Department the responsibility for specifications, to the Transportation Corps the determination of requirements and provision of funds, and to the Quartermaster Corps responsibility for purchases and inspection. And for the item, boat, rescue, aircraft, the AAF was given responsibility for preparing specifications, determining

requirements, providing funds, and storing and issuing; and the Transportation Corps was given the job of purchasing and inspecting.

These, then, are the three problems of the planning phase, and while their solution might seem simple, it is well to remember that it required two years

Problems of the operating agencies can also be listed under three headings: contract negotiation, administration, and termination.

Contract Negotiation.—Each of the technical services established many procurement offices, procurement districts, and, altogether more than 5,000 purchas-

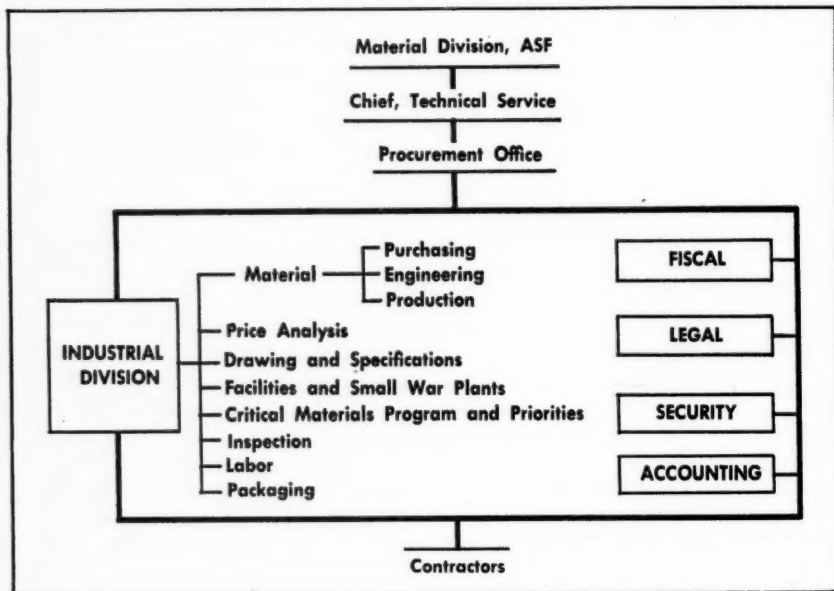


Figure 11.

to pass from the emergency phase to the routine phase.

Problems of the Operating Agencies

The operating agencies during the last war were the Army Air Forces and the seven Technical Services. As we have seen they procured items according to the assignments made by the Procurement Assignment Board, in quantities determined by the Requirements Division, under regulations laid down by the Purchases Division, and assisted in their production problems by the Production Division.

ing and contracting officers to decentralize operation, and to reach the entire industry of the country. Each of these officers had full authority to sign contracts on behalf of the government. Peacetime practice calls for careful attention to economy; public advertisement, sealed bids, bid and performance bonds, and awards to the lowest bidder. In wartime, however, the need for speed and the need for secrecy combine to eliminate these restrictions, and we have instead the method of negotiation which gives the

government agent considerable freedom in placing contracts with the contractor he selects. He was empowered to select contractors so that he could:

- a. Place primary emphasis on delivery within the time required.
- b. Place the contract where the least amount of new machinery and equipment would be required.
- c. Avoid areas of labor shortage.
- d. Give large complex contracts to large manufacturers and smaller contracts to smaller manufacturers.
- e. Disperse contracts for protection.

He was, however, forbidden to contract with violators of labor relations laws or with contractors who had not performed well on previous government contracts. The Purchasing Officer was also required to deal through other government departments when they had been designated as the sole contracting agents for certain items; for example, gasoline contracts had to be placed with refineries holding Treasury Department contracts; lubricating oil was procured through the Navy, and food and lumber were procured by other government departments through the Army.

The contract itself was greatly simplified during the war. It could be oral, or made by telephone, and a contractor could proceed on this verbal basis to expedite manufacture. Contracts had to be finally in writing and filed with the General Accounting Office, but the forms were greatly simplified. Government contracts are, like other contracts, an offer and an acceptance; a government offer and the contractor's acceptance, or a contractor's bid and the government's award of contract. The terms of payment could be either those of a fixed-price contract or those of a cost-plus-fixed-fee contract.

While the individual purchasing and contracting officer was the key figure in procurement, and upon his judgment millions of dollars were spent, still the

government procurement program was not dependent upon the ability of any one man. Each branch had many procurement offices out of which the purchasing officers worked, and these offices became very efficient in backing up the purchasing officer with accurate data.

When a procurement directive came to a procurement office from a technical service, before the negotiator in the purchasing section committed himself, the engineering section prepared plans and specifications, the production section analyzed productive problems, the price analysis section determined a fair price, the facilities section surveyed the field for likely bidders, and the proposed contracts were passed upon by the fiscal, legal, security, and accounting branches. The negotiator had in his procurement office a wealth of expert advice and assistance. (Figure 11.)

In the future, negotiation will again be the method of wartime contracting and the same principles will find an application.

The Air Force agency for procurement was the ATSC. Within the ATSC procurement was the responsibility of the Deputy Commanding General for Supply, the T-4. Within the T-4's office the Supply Division determined all air force requirements other than aircraft and their accessories, and these quantity figures were forwarded to the ASF for procurement. The Procurement Division estimated the quantities of aircraft required and supervised the contracting for, and the production of, all aircraft and aircraft accessories.

The field agencies of the ATSC were the ATSC areas and districts, the areas accomplishing supply and maintenance and the districts accomplishing procurement and production. The districts were three in number with their headquarters in New York City, Chicago, and Los Angeles. Their organization for procurement was as shown in Figure 12, with

the procurement section doing the negotiating of contracts; the production section obtaining allocated materials for contractors, scheduling production and supervising AAF plant representatives; the inspection section determining that contractors were meeting specifications; and the readjustment section making plans for contract termination.

officer during the performance of the contract. In a cost-plus-fixed-fee contract a contracting officer must frequently inspect production to determine just which costs shall be allowed. If a contractor is paid for his progress, a contracting officer must be present to determine progress. These are examples of contract administration.

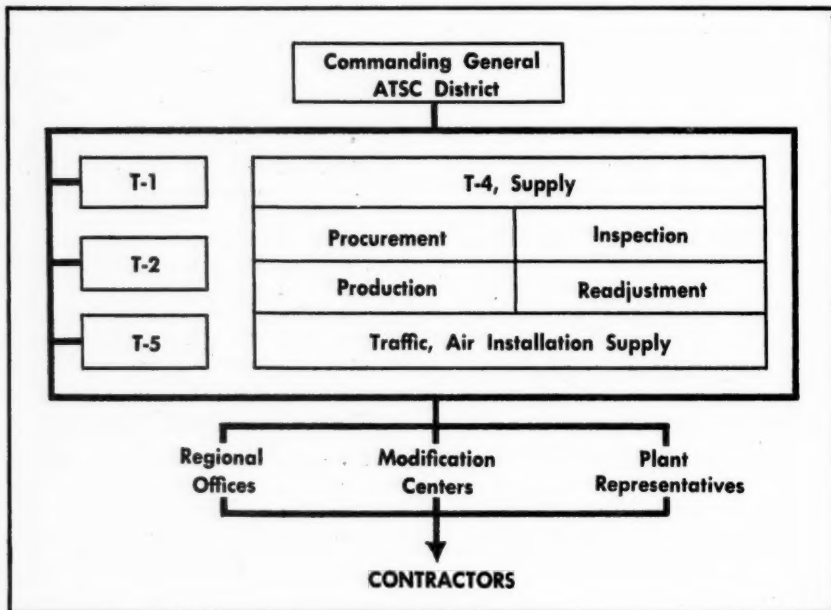


Figure 12.

Purchasing and contracting officers in the Air Forces were limited to \$5,000 contracts, while those working from an ATSC district were limited to \$100,000. The Procurement Division approves contracts up to \$1,000,000. The T-4 approves contracts up to \$5,000,000, and contracts larger than that must go to the Undersecretary of War for approval.

Contract Administration.—Most War-time contracts call for certain action to be taken by the purchasing and contracting

The ATSC handled contract administration in two ways. First, though Field Procurement Offices which administered all contracts within a designated area, which were organized to include an inspection branch to see that specifications were met; a contract branch to fulfill the contracting officer's duties in cost determination and progress reporting; an industrial property accounting branch to keep track of government owned facilities, and an industrial planning and collecting

branch to collect educational data for further AAF contracting (Figure 13). Secondly, the ATSC administered contracts through plant representatives which it placed in the factories to keep the government's requirements before the contractors, to discover deficiencies in inspection systems, to control the use of

greater accumulated data the Price Analysis Section of Procurement Offices were able to make contracts successively more realistic so that as war progressed fewer contracts needed any substantial renegotiation. Contracts made after the Renegotiation Act of 1943 contain clauses providing for renegotiation. However any

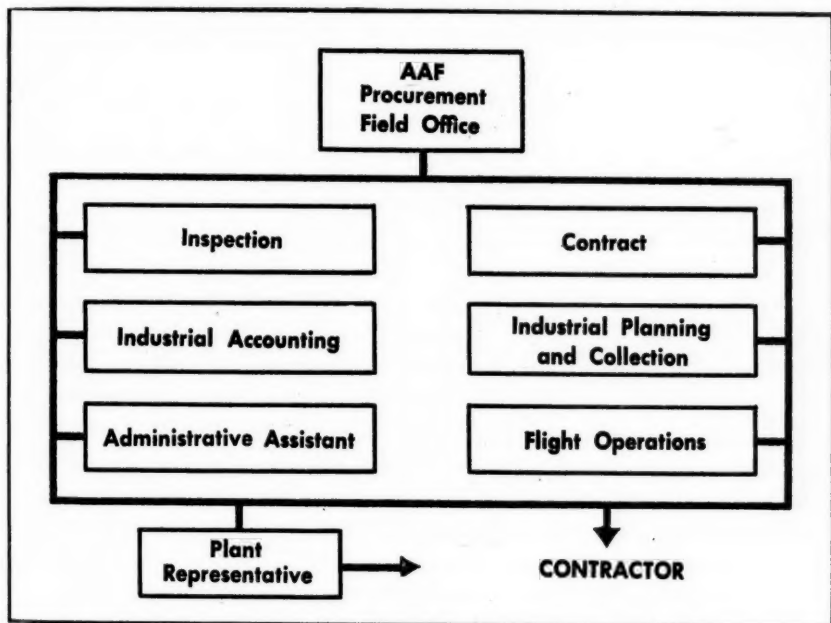


Figure 13.

government property, and to plan contract settlements.

It is a somewhat common misconception that contract renegotiation is connected with termination or readjustment. Instead renegotiation is a feature of contract administration caused by early inexperience in war contracts. It allows the government to recover excessive prices paid to manufacturers whose original estimates on costs were high. The intention of the government is to allow a fair profit but not an excessive one. With

contract may be renegotiated by the government within a year of its completion if it is for an amount greater than \$100,000. Renegotiation acts like a 100% excess profit tax and has been described as getting a contractor to agree now to a price he would have charged before, if he had been bidding in a competitive market and knew then what he knows now about his costs and his margin of profit.

Contract Termination.—The Contract Settlement Act of 1944 anticipated the

end of hostilities and the need for widespread sudden contract terminations. It provided for advance planning for terminations. This advance planning was so well carried out that at the war's end, seventy billion dollars of outstanding contracts were terminated with surprising speed. The advance planning used involved discussions between government and manufacturer resulting in pre-termination settlement agreements and in written plans for the termination of each contract settling such controversial items as stop work points, methods of taking inventories, inventory pricing, property, spare parts, and raw materials that would be required by the government, and authority for scrapping the rest.

Conclusions

In another war we will still require planning agencies to do the three jobs of allocating materials, assigning procurement responsibilities, and determining quantities required to be produced. These will be on international, national and armed forces levels. Two of the five levels used in the last war can be eliminated by unification of the services.

As for the operating agencies preferably under a single office for procurement, we will need uniform procurement regulations, centralized control, and decentralized purchasing to take advantage of the entire country's industry. We will need again simple contract procedure, efficient procurement offices, and our plans for renegotiation and terminations should be made almost at the time of contracting.

Long-range advance planning will be needed for all levels so that by emphasizing research and development now instead of after the beginning of hostilities we can be ready to standardize production. By maintaining adequate stocks of dispersed reserves, we can stand off the first shock of attack that our industry will suffer. By placing critical production underground we will not lose our entire potential in one attack, and through carefully placed orders with industry we can quickly convert to a full wartime basis of production. And finally, by this advance planning, we can insure that the period of emergency procurement can give way to routine planned procurement, not in a period of years, as in this war, but in a period of days.

Up to the end of 1946 . . . the United States disposed of \$6,803,995,000 worth of surplus war goods throughout the world. In return, it received \$1,589,558,000, or roughly about one dollar for every five dollars of the original cost. . . .

If there is any moral in the figures, it is simply that war is no bargain. War is waste. War is what forces nations to write off money losses as inevitable—like the loss of blood, which is far more terrible. . . .

Probably it does no good to mourn over the might-have-been, but then again, if men and nations would contemplate it enough, they might learn something from it. Along with other things, such as the atom bomb, it might teach them at last the wisdom of peace. It might teach them that if they would spend only half as much on peace as they have spent on war, there would be no loss for any one, but profit for all.

Washington (D.C.) Star

The Occupation of Korea

— Operations and Accomplishments

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This is the second of two articles on this subject by Lt. Col. Sinclair. It supplements an article which was published in the July issue of the MILITARY REVIEW.—The Editor.

THE occupation of Korea by the XXIV Corps began at 1430 on 8 September 1945, when troops of the 7th Infantry Division went ashore at Inch'on. Unloading was complicated by a 30-foot tide condition and by a lack of unloading points. Available for use were three ramps and a tidal basin which could be entered and left through lock gates. At low-tide the harbor was a huge mud flat, except for the channel leading to the tidal basin, and only one of the ramps reached the water. By nightfall, however, the division was well ashore and had evacuated 168 American prisoners of war who had been held at Inch'on. The same day, the corps chief of staff with Army and Navy representatives, held a preliminary surrender conference ashore in the customs building. At this meeting, representatives of the Japanese government in Korea, the Army, and the Navy were given final instructions as to the exact procedure to be followed and were allowed to ask questions regarding the protocol and instructions which had previously been furnished in writing by the advance party. (Note: the advance party had landed in Korea by air on 6 September.)

Unloading continued all night and the next day. About noon, a long convoy bearing the Army and Navy personnel who would be present to witness the surrender ceremony started from Inch'on to Seoul, a distance of twenty-eight miles. Koreans who had been excluded from the unloading area by the Japanese authorities, lined the highway most of the distance and were extremely enthusiastic in their welcome. Flags of the United States, Korea and of other Allies were in evidence everywhere, as were signs of welcome written in English. In Seoul, the streets were jammed as the convoy moved to the government-general building. Since the instrument of surrender had been furnished to the Japanese signatories, there was little to the actual surrender ceremony except the perfunctory signing of the documents. At 1600, 9 September 1945, the American signatories, their staffs, the press (both American and Korean), and selected military spectators all gathered in the throne room of the capitol. The Japanese governor and the senior army and navy commanders were brought in, and after a short address by Lieutenant General John R. Hodge, commander of the occupation forces, the surrender instruments were formally signed, bringing to an end the Japanese domination of the country. Immediately after the signing of the surrender, the Japanese flag which had been allowed to fly in the capitol grounds was hauled down and the

American flag was run up in its place. In accordance with instructions previously issued, all Japanese troops had been withdrawn from the Inch'on—Seoul area, except for minimum essential police detachments. These were rapidly replaced by troops from the 7th Infantry Division. This same day, 150 British prisoners of war were evacuated from their camp in Seoul and placed aboard a hospital ship at Inch'on.

On 11 September, the XXIV Corps Headquarters was officially established ashore in Seoul. The following day a small group of enterprising newspaper correspondents made the first (but unofficial) contact with the Russian occupation forces. On 16 September, troops of the 7th Infantry Division made the official juncture while a joint Army-Navy reconnaissance detachment arrived in Pusan at the southern end of the Korean peninsula. During these first few days of the occupation, the Japanese governor and the Japanese director of the National Police Bureau were removed from office, and immediate replacement of Japanese civil police by Koreans was begun. Supplies continued to come ashore, and the tactical elements spread out in all directions from Seoul. The Korean populace adopted a semi-holiday attitude and watched with wonder and patience while the American Forces slowly gathered the reins of a situation which was far from clear, and of which the barest amount of intelligence had been available beforehand.

On 22 September, the first elements of the 40th Infantry Division unloaded at Inch'on to begin their overland rail movement to Pusan. Initial plans for the unloading of this division over the excellent docks at the southern port had been forced aside when the presence of mines was detected. The same day, 354 British and Australian prisoners who had been interned in north Korea arrived by rail at

Inch'on after arrangements had been made with the Russian commander at P'yongyang and were embarked for the Philippines. This completed the recovery of all Allied prisoners in Korea. Meanwhile, elements of the 40th Infantry Division continued to arrive, and by 4 October, the entire division was ashore and in control of the southern portion of the American zone. During the same period, the 308th Bombardment Wing had set itself up at Kim'po airfield, about ten miles west and a little north of Seoul.

The 6th Infantry Division, the last of the major elements of the occupation force, began its landings at Inch'on on 17 October to move by truck and rail into its sector in the southwest portion of the peninsula. The division was completely ashore by the end of the month.

As the tactical troops progressively arrived and spread over the country, military government control was also reaching out into the provinces. A headquarters had been established in Seoul, consisting principally of the former Tenth Army antiaircraft artillery headquarters battery to which had been attached a number of military government officers from Okinawa. Three provisional military government companies were operating in the Seoul—Inch'on area. As additional companies arrived, they were moved out into the provinces where, with the assistance of the tactical troops in the area, slow but steady progress was made in the actual assumption of control of the civil government.

Major Problems

The two major problems which faced the occupation troops were the disposition of the Japanese armed forces in Korea and the restoration of civil government. The former offered no great difficulties since the Japanese commanders and channels were present and could be used, and the disarming, disbandment, and shipment to Japan was accomplished largely by

the Japanese themselves. The 40th Infantry Division had a tremendous task to perform in the reception, inspection, preparation, and embarkation of the Japanese troops at Pusan. The account of this operation is a separate chapter in itself, but the evacuation of the enemy armed forces by and large proceeded smoothly and efficiently without any major upset. On the other hand, the restoration of the civil government was persistently beset by many perplexing problems, many of which still exist.

The first of these problems is the 38th parallel, which was arbitrarily set as the boundary between the United States and the Russian occupation forces, by agreement between the major Allied Powers to effect the Japanese surrender. This was a military decision based on military consideration at the time of the Japanese capitulation. While this "boundary" was intended to be but temporary, it has continued as a barrier to the geographical, economic and political unity of Korea. This boundary not only split the country economically and irritated the Koreans, but it also upset and prevented every step toward putting the country on its feet. Minerals and chemicals from the north were not available to the south. Travel, mail, and communication between the two zones was at first prohibited, and is now enjoyed only to a limited extent. Three of the country's thirteen provinces are arbitrarily divided into disjointed elements.

A second problem resulted from an unfortunate translation. While the Cairo declaration (November-December 1943) guaranteed freedom to Korea "in due course," this term was interpreted by the Koreans to mean "immediately." When they saw no signs of immediate freedom, unrest and disappointment appeared. Even when the source of the trouble was discovered and explained, the hopes of the independence-loving Koreans had suffered a serious blow.

Third, the existing government was practically impotent. In Korea the situation was far from that which existed in Japan, where the directives of the Supreme Commander for the Allied Powers was promptly exercised through a well-established, organized government. In Korea, the Japanese had lost control with the arrival of the United States Forces, and even though they were nominally in office, they neither cared nor dared to take any action. Moreover, public sentiment both in Korea and in America demanded the immediate removal from office of these Japanese without whom there would be no organization. Thus the Supreme Commander in Korea was in the ironically impossible situation of being required to remove from office summarily a considerable group of individuals who, because their experience was so urgently needed by the American Military Government, were all but indispensable at the time.

Although no one in the military profession likes to admit that individuals are indispensable, here was a case where the situation was approximated, for another major difficulty was the lack of experienced Korean personnel. The Japanese had controlled the entire country simply by seeing to it that all important offices were filled by Japanese or by Koreans who were sympathetic to the Japanese. Thus, in 1936 for example, the central offices of the government-general were occupied by 1,648 Japanese and only 321 Koreans. Patriotic Koreans and those who demonstrated any antagonism to the Japanese domination were never permitted to occupy any important post. Naturally this prevented the Koreans from producing trained administrators, leaders, and executives who could step in on a moment's notice and replace the evicted Japanese officials. This in no way is a reflection on the inherent capabilities of the Koreans. There are a great number of capable, energetic individuals who, with ex-

perience, will furnish able leaders for Korea; it is to be expected that modern education and democratic experience will furnish others in great numbers. But it is a serious blow to any country to be denied participation in its own government for a complete generation.

Again, the country faced, and still faces, a terrific shortage of machinery and materials. That machinery which the Japanese failed to move to the home islands has become antiquated and practically worn out. Raw materials are scarce, because of the demands of war plus forced shipment to Japan. In the American zone, this shortage is further aggravated, as has already been pointed out, by the existence of the 38th parallel as a barrier to free intercourse between the two zones. Inflation, a result of several factors, was another serious problem. The Japanese, before the arrival of the American Forces, had issued huge quantities of notes, thus adding greatly to currency circulation. Shortages of consumer goods and raw materials, generally high prices as well as generally unsettled economic and political conditions were contributing factors. Whenever demand exceeded supply and forced prices up, the Japanese were not at all averse to printing more yen, even though there was nothing to back the issue. As a result, most of the Koreans had fairly substantial quantities of yen, but there was either nothing to buy or prices were too exorbitant.

Finally, there was a language barrier of tremendous proportion. The units arriving in Korea were accompanied by as many Japanese interpreters as could be made available, but most Koreans do not speak Japanese even though it has been the official language since 1910. Furthermore, the mere sound of Japanese is extremely distasteful to most Koreans. Nevertheless, it was mandatory that Japanese and the available interpreters be used, although in many instances mis-

understandings resulted. As might be expected, any Korean who could speak English was in great demand, but there were far too few of these, and some of the few, unfortunately, used their talents unscrupulously to promote themselves at the expense of their people and the efforts of the occupation forces. This problem still exists, for even today in Korea there are not enough Americans who speak Korean and vice versa.

Accomplishments

In spite of these problems, each of which is a major stumbling block in itself, the sum total of the accomplishments of the occupation troops is impressive, and great strides have been made since the job began, only a few of which can be cited here due to limitations of space. As of the end of April 1947, some 912,259 Japanese were evacuated to Japan, including some 195,000 military personnel. At the same time, 1,907,003 Koreans, principally from Japan, have been repatriated. Some 70,000 Japanese and another 30,000 pro-Japanese Koreans have been removed from civil service in the government. Korean press and radio have been given the freedom which is enjoyed by American press and radio. Some 3,936 Japanese officials were removed from the government communications establishment without interruption of transmissions, despite the fact that these officials occupied eighty-four per cent of the key positions. Forty-one courts and nineteen prisons have been staffed by Koreans and put in operation. The civil police force has been rebuilt with Koreans to a strength of 25,000 and a police academy handled 313 new policemen in each class. A modern Korean Constabulary, designed to serve as a reserve force for the maintenance of internal security, was established, as was a Korean Coast Guard, designed to patrol Korean coastal waters to enforce the customs laws and prevent

smuggling. Except for the evacuation and repatriation figures which are up-to-date through March 1947, the other items appeared in a report dated January 1946.

It is appropriate to examine the method by which these things have been accomplished, for in spite of the intolerable situation which exists in Korea from an international point of view, the method has been successful. Because no adequate military government organization was available at the beginning of the occupation, primary dependence for the execution of all missions was of necessity placed upon tactical commanders and their units. Until such time as a military government organization could be built, all tactical units had to adjust themselves, their outlook, and their equipment to the performance of the principal functions of military government. As the military government units and channels developed, the occupation commander gradually charged them with more and more responsibility. Simultaneously the mission of the tactical troops changed from one of responsibility to one of support, but always retaining responsibility for the preservation of law and order. The nucleus of the present military government organization was an army antiaircraft artillery headquarters battery, as has already been mentioned. On its swollen morning report, far in excess of authorized strength, were carried the military government specialists who arrived in increments, and to it were attached several miscellaneous units for administrative purposes. In December 1945, a bulk allotment was received from the theater headquarters which authorized the creation of the United States Army Military Government in Korea (known as USAMGIK). With its establishment as a major echelon of the XXIV Corps, responsibility commenced to pass from the tactical troops, until eventually USAMGIK was in complete charge with the tactical

troops responsible for support and assistance and for the preservation of law and order in emergencies. Then began the next phase, which is still going on, namely, the gradual integration of Koreans into the system to participate more and more in the functions of government, as well as to operate business, industry, and utilities; too, American civilian specialists began to replace some of the army personnel in Military Government. Today, schools, courts, railroads, newspapers are all-Korean enterprises, with military government personnel in supervisory capacities to help and advise. Business and industry, hampered though they are by outmoded equipment and the lack of supplies and material, are struggling along. The police force is a Korean institution and has done a commendable job. With the establishment of the Korea Interim Legislative Assembly, which held its inaugural meeting 12 December 1946, Koreans were given the opportunity to participate even further in their government. This Assembly of ninety members, half-elected, half-appointed, has the authority to enact legislation on all matters pertaining to the public welfare as well as such other matters as may be referred to it by the Military Governor. The broad scope of the Assembly's authority is indicated by the fact that the Military Governor has urged it to consider, among other items, such vital subjects as government finance, the food problem, land reform, and universal suffrage.

Conceivably, by this time a government could have been created and given control of the American zone south of the 38th parallel. But the aim of the occupation forces of both countries was to eliminate the Japanese control with self-government of Korea by Koreans as the ultimate goal. The original occupation instructions, hurried in their preparation by the sudden capitulation of the Japanese government, did not have time to deal with the problem

of this eventual self-government nor how it was to be contrived. At their Moscow meeting in December 1945, the Foreign Ministers of the United States, the Union of Soviet Socialist Republics, and the United Kingdom considered, among other things, the Korean situation. At this conference it was agreed that there should be established in Korea a provisional government. To assist in the formation of the provisional Korean government, a Joint Commission was to be established of United States and Russian representatives. This Commission, in making its proposals was to consult with the Korean democratic parties and social organizations. The Commission was to be directed to "work out measures also for helping and assisting (trusteeship) the political, economic and social progress of the Korean people, the development of democratic self-government and the establishment of the national independence of Korea." The proposals of the Joint Commission were to be submitted for the joint consideration of the United States, Russia, Great Britain, and China "for the working out of an agreement concerning a four-power trusteeship of Korea for a period of up to five years." As reasonable and as promising as this looked at the time, the Moscow conference drew a tidal wave of bitter resentment from the Koreans, and again the language barrier was responsible. There is no literal translation into Korean of the word "trusteeship." Its closest equivalent is a word which connotes the same form of oppressive supervision and control associated with Japanese domination of Korea. In spite of all explanations and official statements as to the intent of the four powers, the Korean press and political organizations inveighed against trusteeship. All parties, with the exception of those whose sympathies leaned toward Russia and Russian political ideas, expressed themselves strongly and bluntly. However, the two military commands pro-

ceeded with the execution of the directives of the Moscow conference. A preliminary meeting of representatives of the XXIV Corps and the Russian 25th Army met in Seoul during January 1946 to settle urgent problems, and to arrange the details of the commission meetings. On 20 March 1946, the Commission held its first meeting in the Duk Soo Palace in Seoul, where Korean kings had formerly lived. Each country was represented by five delegates, who paired off into two-men teams for the working out of problems and programs. On 8 May 1946, the Commission adjourned, and the Russian delegation returned to north Korea. The Commission adjourned because it was unable to agree on the qualifications of the Koreans who should be invited to participate in the formation of the provisional government. The Russian delegates insisted that only those Koreans should participate who were not opposed on the record to trusteeship. Since the communist parties and groups were the only ones who had not spoken against trusteeship, the Russian proposals were obviously not acceptable to the American delegates.

Since 8 May 1946, various proposals and suggested platforms upon which the Joint Commission might again proceed have availed nothing. Meanwhile, American efforts to incorporate Koreans more fully into the actual control of south Korea have gone ahead in spite of the definite split of the Koreans themselves into well-marked right- and left-wing groups. On 22 July 1946, a coalition council of five right- and five left-wing members (all Koreans) began deliberations to develop unification and to resolve such points of difference as could reasonably be adjusted. Although the council broke up on 29 July, after a couple of stormy sessions, it reconvened and agreed on 7 October to seven basic issues:

1. Establishment of a democratic tran-

sitional government in accordance with the Moscow decision.

2. Reconvention of the United States-Soviet Joint Commission.

3. Land redistribution with little or no compensation to the large land owners; nationalization of important industries.

4. Punishment of the pro-Japanese and national traitors by the legislative organ acting on the recommendation proposed by the coalition council.

5. Release of political prisoners.

6. Draft of plans for the legislative organ.

7. Freedom of speech, assembly, and organization.

Concurrently, in accordance with a suggestion of Major General Lerch, the military governor, and approved by General Hodge, the plans for a Korean Interim Legislative Assembly were under way. This body was intended to increase the democratic participation of Koreans in the government, to assist the military governor in the performance of his duties, to approve the appointment of Korean officials, and to make known the wishes of the people. The Assembly was officially established on 13 October by a military government ordinance, and election of members was held between 17-22 October. The size of the Assembly was set at ninety, of which half of the members were elected while the other half were appointed by General Hodge from nominations submitted by the coalition council. On 4 January 1947, the mission of the assembly was clearly defined when General Hodge stated publicly in part: "... it must remain clear to all that the Legislature is not a government within itself, nor is it the governing body of south Korea. It is exactly what its name implies: an Interim Legislative Assembly with legislative powers to make laws for the enforcement by the executive branch of government, and to assist the executive branch in carrying out government in south Korea according

to the will of the Korean people pending the establishment of the Korean Provisional Government under the Moscow decision."

Recent High Level Developments

It is clear that United States efforts in Korea have, from the first, avoided anything which could be construed as the establishment of a separate government of, or for, south Korea. Continued optimism has looked for joint development of a Korean government as provided for by the Moscow decision. Finally, with little expectation of cooperation from the Russians, United States policy began to change. On 8 April 1947, Secretary of State Marshall, attending the Peace Conference in Moscow, called upon the Soviet government for cooperation in two ways:

1. Reconvene the Joint Commission with the purpose of evolving and solving measures for Korean independence.

2. Fix a date during the summer of 1947 for a review by Washington and Moscow of the Commission's work.

"In the meantime," said General Marshall, "the United States, mindful of its obligations under the Moscow agreement, sees no alternative to taking, without further delay, such steps in its zone as will advance the purposes of that agreement." The recent exchange of communications between General Marshall and Mr. Molotov has resulted in an agreement to reconvene the Joint Commission. It is reported that the United States may proceed with the following steps in developing the southern zone of Korea:

a. Enactment by the Interim Legislative Assembly of a general election law.

b. Hold national elections to elect by popular vote *all* members of the legislative assembly.

c. Gradual withdrawal of USAMGIK to the background as Koreans step into the picture.

d. Replacement of the present military administration with a high commissioner

who will represent the State Department until Korea is ready for full independence.

At the same time, reported plans call for the appropriation of \$215,000,000 to provide a foundation for the economic recovery of the country.

Probably nothing would please the Koreans better than to see both the United States and the Russians withdraw their troops and make Korean independence an accomplished fact. The United States would prefer to do the same thing, but this will not be done so long as the country is split in the middle with another nation running the other half. To withdraw under these conditions would violate the provisions of both the Cairo declaration and the Moscow agreement. Therefore, the switch in United States policy is done partly to coerce Russian cooperation and to emphasize American determination to stick it out until the country is unified. Also, it is plain that the sooner the United States zone can be placed on firm financial feet, the sooner the flow of American dollars for occupation costs and relief can be curtailed.

In spite of the generally disparaging remarks which have appeared in the press

to date regarding the efforts of United States military government in Korea, it is the writer's opinion that these efforts have been sincere, sound, and successful, especially when the size and scope of the obstacles to success are fully considered. Law and order have been maintained in the face of agitation, strikes, and riots which have been inspired and engineered by dissatisfied political elements. Roads, railroads, and communications have been continuously maintained and improved. Freedom of speech, press, radio, and education have been restored to a degree never before enjoyed by the Korean people. Public health and sanitation have been developed with outstandingly successful results. Fair and impartial government has been administered with consideration at all times for the desires and welfare of the governed.

To withdraw at this time would certainly expose these gains and accomplishments to the possibility of blight and submersion. The new United States policy offers both hope and promise of making Korea—at least the southern half—a free and independent country where democracy can live and flourish.

We live in a world in which strength on the part of peace-loving nations is still the greatest deterrent to aggression. World stability can be destroyed when nations with great responsibilities neglect to maintain the means of discharging those responsibilities.

President Harry S. Truman

Joint Operation Aspects of the Okinawa Campaign

Lieutenant Colonel Walter Killilae, *General Staff Corps*

This is the third of three articles on this subject by Colonel Killilae. It supplements the articles which appeared in the June and July issues of the MILITARY REVIEW.—The Editor.

Base Development

AS previously stated, the main objective of the "Iceberg" Operation was to establish bases from which to attack the main islands of Japan and support further operations in the regions bordering on the East China Sea. To accomplish this object, the Okinawa Area had to be rapidly developed into one of the largest air, land and naval bases in the Pacific. How was this task done?

First, let us examine Okinawa and the surrounding islands to see what natural and artificial features were present at the time of the planning phase for the operation which would assist in the establishment of a base. The size and topography of the islands were discussed in the first of these articles. The total civilian population in April 1945 was over four hundred thousand. On Okinawa there were five airfields, three of which had only one runway. On Ie Shima there was one airfield having three runways. The roadnet, in length, was sufficient for the operation, except, however, for a short stretch from Naha to Shuri it was of one-way construction and built of poor materials. Two harbor areas were available on Okinawa—Naha and Naka-

gusuku Bay. Neither of these was in condition to take the large amount of tonnage necessary for the operation nor for subsequent projected areas. Other islands in the vicinity had none, or only small harbor areas, although a fleet anchorage was available in the Kerama Retto.

Using these features as a basis, and with the assumption that most all artificial features would be damaged or destroyed during operations, a base development plan was made by CINCPOA. This plan contemplated: (1) the construction, or rehabilitation, of eighteen airfields; (2) the development of Nakagusuku Bay into an advanced fleet base with port facilities to provide logistic support for major fleet units and occupation forces; (3) the development of Naha Harbor to accommodate support shipping for Okinawa and subsequent operations; (4) the reconditioning of the existing roadnet; (5) the construction of bulk storage installations and camps; and (6) several minor projects. In addition to construction, the base development plan called for the establishment of military government and the defensive works for the islands. Approximately one hundred sixty thousand service troops would be necessary to complete the plan.

To accomplish the task of base development, CINCPOA, on 13 December 1944, established, and placed under Tenth Army, a force designated as "The Island Com-

mand." This command, in addition to base development, was made responsible for the supply of the forces ashore. Specifically, its major missions were:

1. To provide the administrative support for the Tenth Army ashore.
2. To execute the Base Development Plan under the direction of the Commanding General Tenth Army, as prescribed by CINCPAC.
3. To establish military government when and as directed by the Tenth Army.
4. To defend the island against land, sea and air attacks.

On the above date, 13 December 1944, Headquarters, Island Command, was activated on a corps level at Schofield Barracks, Hawaii.

Island Command Headquarters moved to Okinawa in two echelons, arriving on L+5 and L+12. Almost immediately, land secured by the combat troops started being turned over to it. On 9 April, Island Command was given its first area, which included the landing beaches and extended five miles inland. As the operation progressed, more and more land passed to its control, until by 30 June all Okinawa was the responsibility of Island Command. Ie Shima and other nearby islands had passed to Island Command control at earlier dates.

Base development work started immediately. By the end of April, nineteen army and navy engineer battalions had been landed. This total, by the end of June, had reached thirty-eight. These troops were used for all construction projects. Work on beach exit roads began on L-day. By 30 June, approximately one hundred sixty miles of native road had been reconstructed and widened for two-lane traffic, and three hundred forty miles of roads were under maintenance. Harbor development had begun 30 April. By the end of June, of the eighteen airfields proposed, all had been surveyed, five were in operation, and eight were in

the process of construction. This appeared to be an excellent start. Construction, however, was definitely behind schedule due to shortages of equipment and materials. During the early phases, army engineer battalions arrived with only fifty per cent of the equipment allowed for their mission. The first major shipment of navy construction material arrived as late as 21 May, while the army shipment was even later. As of 20 June, only ten per cent of the total construction material and equipment had arrived. Construction was further affected by the increased number of projects planned without increased personnel. This all was corrected later, so that by the end of the war most projects were forty to sixty per cent complete.

The military government section functioned well, and by the end of the assault phase was caring for over 160,000 civilians. These had been moved from all parts of the island to the northeast shore where they lived in camps and subsisted for a time almost entirely on imported supplies. A start was made to have the civilians raise their own food.

As health conditions throughout the islands were poor, the medical section, upon landing, began its disease control program. This consisted of airplane spraying, native village and battlefield cleanups, special spray teams, and the enforcement of sanitary precautions at water points and within troop bivouac areas. Airplane spraying with DDT solution began on L-day. Occupied areas of the island were sprayed at least once, and the combat areas in the south were sprayed twice or more. The preventive measures taken were so successful that, for the first time in history, during a major campaign, the number of casualties from disease was less than the battle casualties.

Lessons Learned

In selecting the lessons that can be learned from Operation "Iceberg" the im-

portant but relatively detailed technical lessons and improvements that the operation developed have been omitted.

Because the landing at Okinawa was lightly opposed, and also because Iwo Jima had already been used as a proving ground for new methods of amphibious operations in POA, this operation served only to test further these methods and develop additional details of technique, and did not produce any major change in amphibious operations.

During the operation, the navy made many improvements in the details of naval supply and operations, but probably the most important naval lesson was the need for some type of distant protection against attack by low-flying enemy suicide planes. The development of the radar picket screen, and its relatively effective operation against the *Kamikaze* planes, was discussed in the first article of this series. Since future concentrations of shipping may again be the target for suicide planes or guided missiles, the organization and operation of radar pickets, the only defense so far tested in actual operations, should be the subject for continuous study and improvement.

In the logistics field, one new development was the Island Command, a sort of logistical division which operated under Tenth Army and assumed responsibility for the supplies of all forces ashore. This command, not materially different from the advance communications zone section used at Leyte, operated with reasonable efficiency, and did relieve the Army G-4 of much of his operative duty, permitting him to devote considerably more attention to policy.

For this operation, it was necessary to prepare operational projects in order to secure amphibious equipment for assault units. The time required to obtain War Department approval for these projects precluded delivery of all such equipment

to units at their mounting points. As alternatives to this undesirably slow method of processing operational projects, it was determined that (1) Standard T/Os and T/Es be augmented by the War Department, by means of supplementary equipment lists automatically authorized for units preparing to engage in amphibious operations, or (2) Theater Commanders be authorized to approve operational projects and submit requisitions for equipment needed.

The lightly opposed landings and the rapid advance into the interior of the island made this operation, from the army point of view, less an amphibious operation than a problem in mass land warfare. The problems encountered were little different from those encountered in previous operations in the Pacific, and, except for the recurring lessons that had been first indicated in New Guinea, no major development or new methods of land warfare were discovered.

In a few isolated cases, the coordination of artillery, naval gunfire, and air support was unsatisfactory. In general, however, this coordination was effective and produced excellent results. To insure improved coordination for future joint operations, it was determined that a naval officer of considerable gunnery experience, and with rank not less than lieutenant commander, be attached to the army artillery section. This officer should be from the naval staff comparable to the senior army staff with which he will operate, and he should be present from the start of the planning phase to the completion of the naval gunfire support of the ground elements.

Results

The results that were achieved by the successful operation against Okinawa are not easily determined in their entirety. The end of the war came so soon after the island was declared secure that many

of the benefits that could have accrued from the capture were never exploited. Some of the results can be listed statistically, but others, equally or even more important, are less tangible.

Because the results achieved by the operation to capture Okinawa were not achieved without cost to ourselves, comparative figures of U.S. and Japanese losses will be given wherever possible.

Shipping.—During the operation, our forces (surface, air, and submarine) sank over 130 enemy ships and damaged 350 others, in addition to which 950 smaller vessels were either damaged or destroyed. During the same period, our own naval losses, mostly as a result of *Kamikaze* attack, totalled thirty ships sunk and 312 damaged.

Air losses.—The ratio of our aircraft losses to the Japanese losses was roughly 1 to 4½. Known Jap plane losses were over 4,000, compared to which we lost 880. The figure, 880, includes those planes which were destroyed or lost as the result of damage to our aircraft carriers.

Casualties.—Total Jap military casualties will probably never be accurately known, because many Japs died as a result of our destroying or sealing up the caves in which they were fortified. Counted military dead totalled 107,000, and a new high of 7,400 prisoners were taken. U.S. casualties do not include the naval losses after 27 May, the date on which the Fifth Fleet was relieved by the Third Fleet. However, during the period prior to its relief, the Fifth Fleet suffered 10,000 casualties, of whom 5,000 were killed. During the entire period, Tenth Army action reports list their total casualties as over 39,000 with 8,000 of them listed as killed.

In addition to inflicting these losses in men and material on the Jap military machine, occupation of the Okinawa group gave our forces complete control of the

sea and air in and around the Ryukyus, cut Jap sea lines of communications to her territories to the south, and tightened the sea and air blockade on the Jap homeland. Although the air potential of the island was never fully realized (eighteen airfields were in varying stages of construction or planning at the time of the Japanese surrender), Okinawa provided an advanced base for land based fighters, which would have made possible land based fighter support for a landing on Kyushu as well as permitting easy fighter escort for bombing strikes against the main Jap islands.

Additionally, the islands provided a base for our very heavy bombers to operate effectively against targets that had hitherto been inaccessible to them for sustained bombardment. These additional targets assume greater importance when it is remembered that there remained only a few remunerative targets for the very heavy bombers in, and south of, the Tokyo area, and when it is remembered that strikes against the industries of Manchuria and northern China had become increasingly desirable.

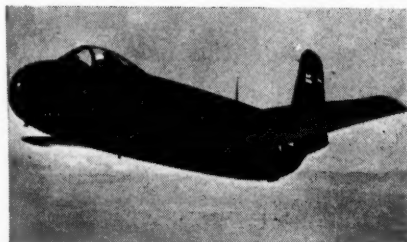
The psychological effects on the Japanese people of our capture of Okinawa are more difficult to estimate. It was apparent that the islands could and would become the springboard for an attack on Kyushu, and when our forces first landed on Okinawa, Japanese spokesmen told the people that the battle for Okinawa was the battle for Japan itself. Later, when the capture of the island was almost completed, the same spokesmen announced that the Japanese nation stood at the crossroads of life and death, and the action taken at that time further emphasizes this thought, for we know now that the Japanese Emperor began trying to initiate peace negotiations through the Russians on 22 June, the day after the Islands were declared secure by the U.S. commander.

MILITARY NOTES

AROUND THE WORLD

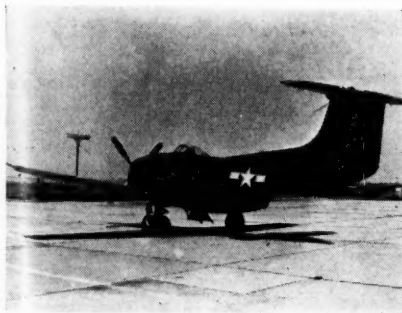
UNITED STATES

F6U Pirate



The F6U Pirate, new Navy shipboard jet fighter, is rated at more than 500 mph. Built by Chance Vought, it is powered by a single jet unit.—Navy photo.

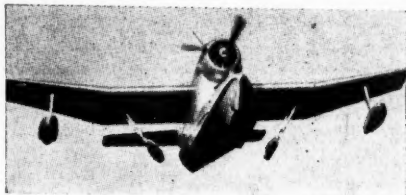
Navy XF15C



The XF15C is the first Navy plane to use a "T-tail," and utilizes both a jet and a reciprocating engine. It was built by Curtiss-Wright.—Navy photo.

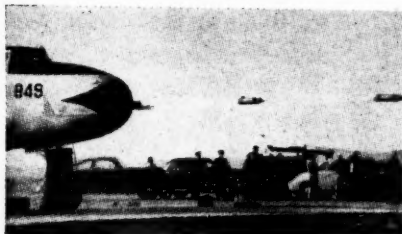
Navy Amphibian

New in-flight picture of the XJL-1, Navy's utility amphibian built by Columbia Aircraft Corp., showing landing gear retracting into the wings. Designed to replace the J2F, the JL carries six as a personnel transport.—*Aviation News*.

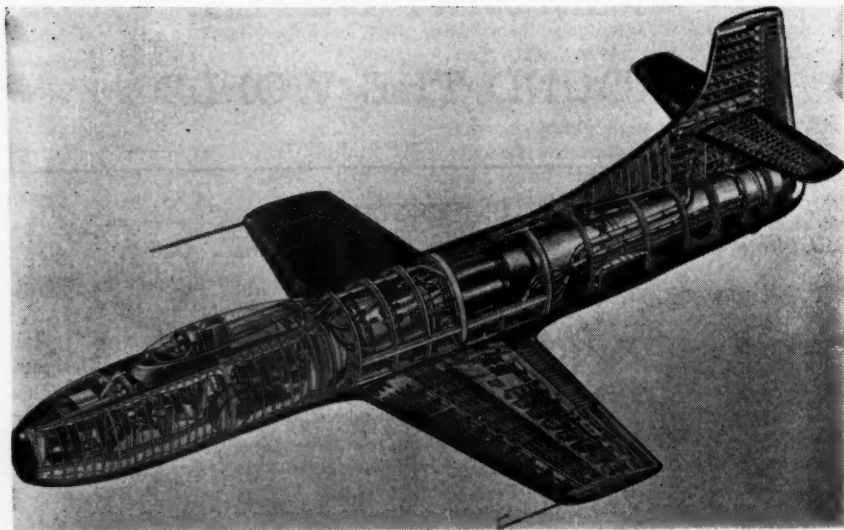


Cruiser Firepower

First tests of the Navy installation of five-inch rockets in the nose of a North American Mitchell (PBJ) bomber. Capable of firing rockets in salvos of ten, the plane has the firepower of a cruiser.—*Aviation News*.



Navy's Supersonic Skystreak



Described as a "supersonic test tube," the Navy's D-558 Skystreak is designed to break the transonic wall at speeds never before attained by man-carrying aircraft. Unlike the XS-1, it will perform entirely

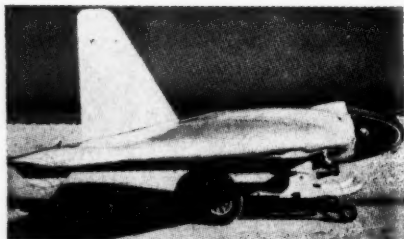
under its own power. A General Electric TG-180 turbo-jet supplies the power. Dimensions are 35 ft 1½ in long, and 25 ft wing span. Gross weight is 9,750 pounds with fuel.—Navy photo.

Patrol Bomber



The Martin XP4M-1, four-engine Navy patrol bomber, has a top speed of 398 miles per hour, and a unique engine installation, with a reciprocating engine and a jet in a single nacelle.—Navy photo.

Rocket Prelude



The first piloted rocket flight of an aircraft in America was in this Northrop flying wing well over two years ago.—*Aviation News*.

Strength of Armies

The strength of the armies of the various nations, based on estimates of US Army officers, are given in a copyrighted article in the "Armored Cavalry Journal."

Russia is credited with the largest, with 3,000,000 men under arms, despite demobilization of 17,000,000 war-time troops. China comes next with 2,700,000, followed by Great Britain with 1,500,000, the United States with 1,100,000, and Yugoslavia with 800,000 of which ten per cent are women.

Other estimates include: France, 150,000; Spain, 300,000; Argentina, 45,000; Bolivia, 15,000; Brazil, 100,000; Chile, 40,000; Colombia, 10,000; Costa Rica, 500; Cuba, 15,000; Dominican Republic, 4,000; Ecuador, 6,000; Guatemala, 6,000; Haiti, 5,000; Honduras, 2,500; Mexico, 50,000; Nicaragua, 3,500; Paraguay, 3,000; Peru, 35,000; El Salvador, 3,000; Uruguay, 8,000; and Venezuela, 10,000.—*The New York Times*.

Supersonic Bombs

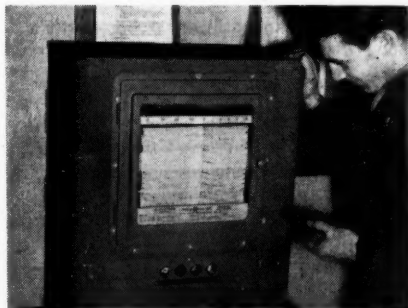
New bombs must be developed for speedy jet-propelled and rocket planes, the War Department announces. Existing bombs cannot be dropped accurately from planes traveling near the speed of sound.

This has been determined in the Army Ballistic Research Laboratories at Aberdeen, Md., by tests in its supersonic wind tunnel and in its free-flight aero-dynamic range.

Just what shape and size will make bombs of the supersonic era effective will depend upon results of studies now in progress. The bombs themselves must be able to fall considerably faster than the present type, have less wind resistance and be more sensitive.—*Science News Letter*.

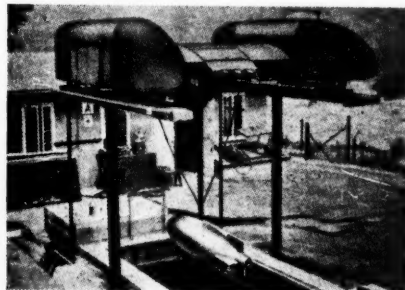
"Ceilometer"

The Army Air Force now has in operation a safe-flying device, an electric-eye cloud detector, called the "Ceilometer." It is used to determine the presence of clouds and to record their height. The device throws up a vertical ray of ultraviolet light which is scanned by a photo-electric cell. When a cloud breaks the beam, it is registered on the recording



instrument and the operator then computes the height of the cloud over the airfield. The recorder unit of the device is shown here.—AAF photo.

Hydrobomb



The AAF hydrobomb is launched from a plane at 350 mph. Propelled under water by a rocket unit at 70 mph, it has a range of 1,000 yards.—*Aviation News*.

Miscellaneous Notes

Pacific Islands

The United Nations Security Council has approved an agreement giving the United States sole trusteeship over three strategic Pacific island chains won from Japan during World War II. The islands in the Marshall, Caroline and Mariana groups include some of the major bases used during the war. The United States gained the right to fortify the islands, build bases, and station troops, with full powers of administration, legislation and jurisdiction.—News report.

Matchbox Camera

A camera no bigger than a matchbox was developed in the United States during World War II, and 1,000 were made for the Office of Strategic Services. Pictures half an inch square could be taken by agents and developed in a pocket-size darkroom with chemicals in the form of pills.—*The New York Times*.

Rocket Motors

Invaluable data for basic rocket motor design and fuel development has been compiled during the past year at the first ground testing station of the Army Ordnance and General Electric near Schenectady, N.Y. Rockets are not launched at the site, but motors up to 50,000 pound thrust can be tested in three massive reinforced concrete pits at the station.—*Army and Navy Journal*.

Automatic Guns

Since VJ-day, the Navy has developed eight-inch automatic turret guns which will fire at battle ranges approximately four times faster than any gun of the same or larger caliber. The batteries, developed by the Bureau of Ordnance, are automatic from ammunition handling rooms to gun muzzles, using cartridge cases instead of powder bags.—*The New York Times*.

Straight Flying

Flying straight and parallel flight lines in aerial mapping and charting is now possible with the new "Straight Line Indicator" operated in conjunction with the war-born Shoran. A model of the device, announced by Air Matériel Command, has enabled the flying of a 125-mile flight with a deviation of only 250 feet. Shoran was developed during the war for precision bombing of unseen targets. Shoran and the new indicator provide the pilot of a photo-airplane with an immediate, visual indication on his instrument panel of a right or left drift, so he can make the flight correction at once.—Air Matériel Command.

Teleran

A new airplane navigation and bad weather landing system called "Teleran" has been developed by the Radio Corporation of America. The system employs ground-based radar, the same as the Ground Control Approach system (GCA), to scan the sky about an airport. Television brings the ground radar scope to the pilot in the plane, who sees the picture on a superimposed map of the airport area. A special transmitter and receiver unit called a transponder gives the pilot a separate radar picture for each altitude.—*Science News Letter*.

Polar Weather

AAF B-29s have been making periodic weather flights over the North Pole from the Suisun-Fairfield (California) base. After May, the flights were planned on a daily basis.—News report.

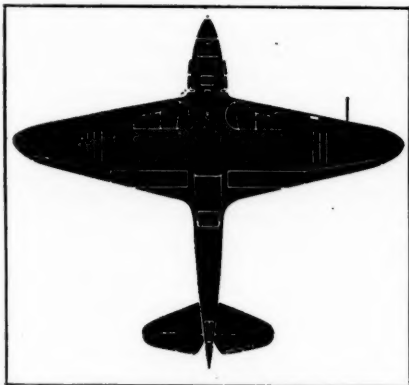
End of Draft

From 29 October 1940, until the Selective Service Act expired on 31 March 1947, 10,200,367 men were inducted into the armed services.—News report.

USSR

Soviet Planes

The Yak-14, a four-seat liaison and light transport, was first reported in 1945. It is a strut-braced high-wing monoplane with strut-braced tail-blade assembly and fixed tailwheel. The "helmeted" cowling fits closely over the M-11 series (about 145 horsepower) air-cooled five-cylinder radial motor, driving a two-blade propeller. Designed by Engineer Lieutenant General Alexander Yakovlev, the Yak-14 has a background in the AIR-series of light planes designed by Yakovlev in the 1930's. Of mixed wood and metal construction, the Yak-14 has the following characteristics:—Span, 39 ft 6 in; length, 27 ft 8 in; maximum speed, 124 mph; range, 620 miles; ceiling, 13,200 ft; climb, 660 ft per minute.



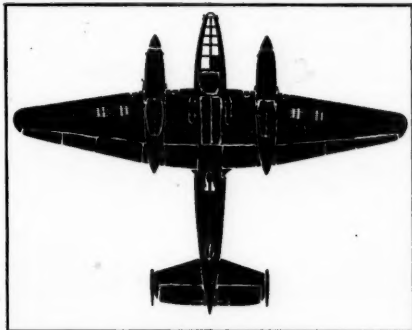
Yak-9.

The Yak-8 eight-seat, two motor feeder-line transport, was designed in the same period as the Yak-14, and appears to be a passenger transport version of the Yak-6 aircrew-trainer. Power is supplied by two M-11 motors encased in the "helmet-type" cowling of the Yak-14, and driving two-blade metal propellers.

The TU-2 attack bomber has three "portholes" on each side and is in the

form of that on the Handley Page Hampden or Martin Maryland.

The Yak-3 was produced at many plants during 1941-1945. Noteworthy is the span of 31 ft as against 32 ft 10 in of the Yak-9. Structure of wood and equipment are extremely simple—loaded weight is only 4,848 lb and French pilots claim that the Yak-3 is faster and more maneuverable than early Spitfires and FW-190As.



PE-2.

The French "Normandie" squadron in the USSR used the Yak-1, Yak-3, Yak-9, and possibly Yak-11s. They returned to France in 1945 with 41 Yak-3s and seven Douglas transports.

The ANT 44 flying-boat is of pre-war design. No details are available concerning the ANT 44 which features a gull-shaped cantilever mainplane mounting four air-cooled radial motors driving three-blade metal propellers.

The present Polish Air Force has been using Soviet aircraft for some time and seems to consist entirely of them. Types in service are the PO-2, UT-2 and PE-3, IL-2 (two seater), Shche-2, PS-84 (LI-2) and Yak-9.

The official title "Soviet" Army or Navy superseded the term "Red" some months ago. Thus the air arm of the USSR is now the Soviet Air Fleet.—*The Aeroplane Spotter.*

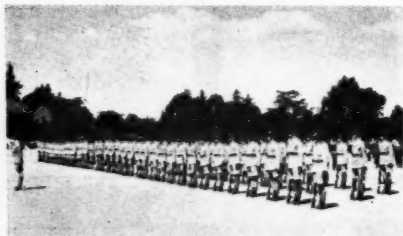
AUSTRALIA

Military College

An exchange of Australian Navy and Army students from the Naval College at Jervis Bay, New South Wales, and the Military College at Duntroon, Australian Capital Territory, with students from Annapolis and West Point has been suggested by the US Ambassador to Australia.

West Point cadets would soon find themselves at home, for Duntroon is based on the American Academy.

In 1911, the buildings and land were acquired by the Australian Government to establish the military college.



Cadets at Duntroon.

Australian candidates are admitted to Duntroon in one of three categories—the four year course, the service entry (three years) and a special entry (one year). A candidate is eligible for normal entry if he is over sixteen and under twenty years of age, is unmarried and medically fit, has passed certain specified examinations and is approved by the Army Minister. He is eligible for service entry if he is a member of the Defense Forces over the age of nineteen, has passed specified examinations and is approved by the Governor-General. He may join by way of special entry if he is medically fit, over twenty and under twenty-five, unmarried, possesses certain educational requirements and is recommended by the Military Board and Minister.—*Australia*.

CANADA

Occupation Forces

All Canadian troops were withdrawn from the occupation forces in Germany at the request of the Canadian Government and contrary to the desire of Great Britain, the Prime Minister has revealed.

The announcement amended a previous government statement that Canada had been left out of the occupation forces by decision of the Moscow conference.

As early as January 1945, in a note to London, the Prime Minister expressed uncertainty as to whether it would be "politically possible" to provide Canadian occupation forces in view of the fact that plans for the control of Germany gave Canada no voice in the direction of policy, since she was not considered one of the occupying powers and was not a member of the Allied Control Commission.

The British Government asked Canada to keep at least one Canadian division and elements of the Royal Canadian Air Force in Europe until after the spring of 1947.

Many of the Canadian troops were in their sixth year of overseas service and there was a demand among the troops and at home that they be brought home.—*The New York Times*.

Dominion War Aid

Canada financed her own war effort and contributed nearly \$4,000,000,000 worth of supplies, food and war materials to her Allies and liberated countries.

More than half of the aid went to the United Kingdom, which in addition received an interest-free loan of \$700,000,000, help of different kinds in meeting its dollar shortage during the war and cancellation of a \$425,000,000 bill as the British share in the Commonwealth air-training plan.

Canada also contributed \$154,000,000 to the United Nations Relief and Rehabilitation Administration and \$95,000,000 for general military relief in Europe.—News report.

SWEDEN

Ice Free Ports

Russia's endless quest for an ice-free port may have been solved by a Swedish invention.

The invention consists of long lines of perforated pipes laid under the channel to be kept ice-free. Air is pumped through the pipes. As the bubbles rise in streams from the perforations they pull currents of water upward along with them. This water, which is above thawing temperature, displaces the thin stratum of cold water immediately under the ice, and melts a clear channel. If used early enough in the winter, it can prevent the initial formation of ice, the inventors claim.—*Science News Letter*.

Civil Defense

A commission of experts appointed by the Swedish government has reported that new weapons and the foreign political situation compel Sweden to maintain a system of civil defense in time of peace. The report proposes the gradual construction of bomb-proof shelters in all localities of more than 30,000 inhabitants to provide ten to twenty per cent of the population with protection against air raids. The first training in fire extinguishing and the care of wounded has already been started in the schools.—*Flügwehr und-Technik*, Switzerland.

NORWAY

Military Equipment

A plan providing for the expenditure of nearly one billion kronen over a three-year period for acquisition of equipment for the Armed Forces has been approved by the Military Commission of the Norwegian parliament. In addition, the normal annual expenditures for military purposes reach 180 million kronen, of which 28 million go to the Air Force.—*Flügwehr und-Technik*, Switzerland.

SWITZERLAND

Two Swiss Planes

The C-3603 is a Swiss fighter, short-range reconnaissance and light attack-bomber, designed to carry a pilot and observer-gunner. Armament includes one 20-mm cannon, one 7.5-mm machine gun in each wing, and one 7.5-mm machine



C-3603.

gun in the rear cockpit. Ten light bombs may also be carried. The engine is a Hispano-Suiza 12Y-51, twelve-cylinder, liquid-cooled. Maximum speed is 295 miles per hour. Wing span is 45 ft 1½ in, and length, 36 ft 9½ in.

The D-3801 is a low and medium altitude interceptor fighter and light fighter-bomber, with a single seat. Armament includes a 20-mm cannon, and one 7.7-mm



D-3801.

machine gun in each wing. Four light bombs may be carried. The engine is the same as in the C-3603. Maximum speed is 325 miles per hour. Wing span is 34 ft 9½ in, and length 26 ft 9½ in.—*The Aeroplane*.

GREAT BRITAIN

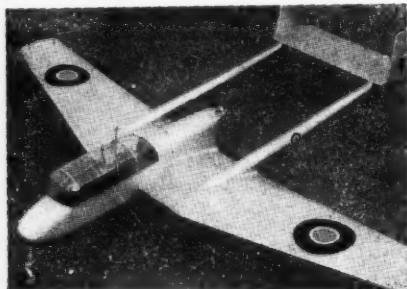
Supersonic Robots

Pilotless rocket-propelled aircraft have been tested off the coast of Cornwall this summer. The area of the tests is west of the Scilly Isles. The aircraft have been diving into the ocean from a height of about 40,000 feet above sea level, their speed ranging up to 1,000 miles per hour.

These exhaustive tests of rocket aircraft operating at supersonic speeds will have important results for future aviation. They are designed to pave the way for safe flying at speeds faster than the speed of sound. Robots are used because the authorities, not knowing a great deal about the effect of such high speeds on humans, could not risk the lives of airmen.

The fuselage of the rocket-propelled craft is twelve feet long and eighteen inches in diameter, with a wing span of eight feet. Mosquito planes based in Cornwall carry the rockets to 40,000 feet before releasing them.—*B.I.S. Notes.*

Liaison Plane



Rear Engine Model.

RAF liaison model will be Heston-built plane, powered with De Havilland Gypsy Queen 33 engine in rear. It will have crew of two, span of 44 feet.—*Flying.*

POLAND

Ships from Soviet

Warships transferred to the Polish flag by the Soviet Navy do not appear to be very significant. They include nine motor minesweepers of 130 tons, names *Albatross*, *Czapla*, *Jaskolka*, *Jastrzab*, *Kania*, *Kondor*, *Kormoran*, *Krogulec*, and *Orlik*—all bird names; and a dozen so-called submarine chasers, wooden motor launches of about forty tons, which have been given Polish names with meanings such as acute, brave, brisk, rapid, etc. A couple of motor torpedo boats have also been acquired from Russia.—*The Navy.*

INDIA

National War Academy

The Indian Central Advisory Board of Education has endorsed the view of the Working Committee of the National War Academy that residential schools to develop character and leadership, should be started by Provinces and Indian States to act as "feeders" for the National War Academy.—*Indian Information.*

AFRICA

Return of Air Bases

The United States policy of returning air installations used during the war in Africa is nearing completion, with all but two of thirty major air terminals already turned over to local governments.

Still in operation by the Air Transport Command is Wheelus Field at Tripoli, Libya, and Roberts Field, near Monrovia, Liberia, which is scheduled for deactivation.

Cazes Airdrome at Casablanca, French Morocco, was deactivated in March and is being operated by the French government. Other fields now returned are John H. Payne Field near Cairo, Egypt, and fields at Oran, Algiers, Tunis, Benghazi, and Suez.—*Army and Navy Bulletin.*

FOREIGN MILITARY DIGESTS

The Strategy of the South-East Asia Campaign

Digested by the **MILITARY REVIEW** from an address by Admiral the Viscount Louis Mountbatten printed in "The Journal of the Royal United Service Institution" (Great Britain) November 1946.

ON 7 October 1943, I arrived in Delhi with five staff officers to set up my headquarters in the Far East. At this time the "order of battle" in the theater was roughly as follows. We had some nine divisions in Burma, which included Indians, West Africans and Chinese, with more in reserve in India. The Japanese had four divisions, but after the announcement of the formation of the South-East Asia Command (SEAC) they built those four up to eleven. We had 634 aircraft—two-thirds British and one-third American. The Japanese had 284 aircraft—forty-five per cent of our strength, but we did not have command of the air. The main reason for that was that our Hurricanes were no match for the Zeros, and it was not until Spitfires arrived at the end of the year that we started to gain command of the air. We had five cruisers and one submarine flotilla in South-East Asia, but, fortunately for us, in February 1944, the Japanese sent their battle fleet to Singapore, which helped on the build-up of our own. In fact, by the end of January, the fleet under Admiral Sir James Somerville had been increased by three battleships and two aircraft carriers, but no destroyers.

I went to Chungking to see Generalissimo Chiang-Kai-Shek and he agreed to allow the Chinese Expeditionary Force to advance from the Yunnan in a synchron-

ized attack, provided I would carry out an amphibious landing in South-East Asia. He asked me to give him an assurance that I would do this, and I said I hoped to be able to give him such an assurance after having consulted the Chiefs of Staff.

On 16 November I took over the operational command from Field-Marshal Auchinleck, and in December I issued an order integrating the British and American air forces under Air Chief Marshal Sir Richard Pierce. Lieutenant General George Stratemeyer became his second-in-command and the Allied Air Commander for Burma.

The Original Plan

I went to the Cairo Conference in November 1943, and laid before the President, the Prime Minister, the Generalissimo and the Combined Chiefs of Staff our plans for the coming campaign in Burma. This was to consist of the following seven related operations:

(1) We had an amphibious fleet which the Prime Minister wished us to use to invade North Sumatra, but we found we could not do it without additional resources. I was told to plan an amphibious operation within my existing capabilities. I, therefore, decided to assault Port Blair in the Andamans in order to break into the outer Japanese perimeter of advanced air and naval bases. From there we could go on to Rangoon or the Kra Isthmus and

eventually to Singapore. This operation was to be carried out by XXXIII Corps with air support from the Naval Air Arm.

(2) The second operation was the advance of XV Corps, supported by the 224th Group, down the Arakan coast to the end of the Mayu peninsula; then, when landing craft became available, they would seize Akyab.

(3) The third operation entailed IV Corps, which was up at Imphal, advancing to cross the Chindwin, with air support from the 221st Group.

(4) The fourth operation was for General Stilwell's Chinese Army and the American Long Range Penetration Regiment (Merrill's Marauders) supported by the 10th U.S. Air Force, to advance down the Hukawng Valley to Mogaung and Myitkyina.

(5) The fifth operation was for the Chinese Expeditionary Force, supported by the 14th U.S. Air Force, to advance from Yunnan to Bhamo and Lashio.

(6) The sixth operation was for the 50th Indian Parachute Brigade to drop on Indaw and seize the airfield, whereafter the 26th Indian Division would be flown in.

(7) The seventh operation was to be carried out by General Wingate's Special Force—known as the 3d Indian Division, which consisted of six brigades, each of eight columns and totaling the strength of two divisions. They were to be flown in or marched in, according to what facilities there were, supported by No. 1 Air Commando and the 3d Tactical Air Force.

At Generalissimo Chiang-Kai-Shek's urgent insistence, the President and the Prime Minister gave him their assurance that there would be an amphibious operation (for I had omitted details of this operation in his presence). In return, he gave his consent to the Yunnan Force advancing and coming under my command on crossing the border.

One further problem concerned the question of command. The Generalissimo did not want Chinese troops to serve under anyone except myself and General Stilwell, and the latter, as Deputy Supreme Allied Commander was unwilling to serve under my Army Group Commander in chief, General Sir George Giffard. We finally compromised, however, by an agreement made at the Plenary Session, whereby General Stilwell should be under the operational control of the Fourteenth Army Commander, General Slim, until Kamaing was reached.

I came back to Delhi, leaving Major General Wedemeyer, my American Deputy Chief of Staff, to hold a watching brief. The Combined Chiefs of Staff went to Teheran in December 1943, and, whatever it was that they discussed with Stalin, when they came back I received an order to send back two-thirds of my landing ships and craft for operations in the Mediterranean. They pointed out that I would have enough resources left to carry out an amphibious operation.

I immediately planned for the British 2d Division to effect a landing on the Mayu Peninsula and to trap the Japanese 55th Division between it and XV Corps, which I was convinced would please the Generalissimo as much as a larger amphibious operation outside Burma. Unfortunately for me, President Roosevelt (and I yield to none in my admiration for him) sent a telegram to Generalissimo Chiang-Kai-Shek apologizing for having to withdraw so many of my landing craft, but saying I would still carry out an amphibious operation, although on a reduced scale. The Generalissimo was very put out and telegraphed that as he considered we had broken faith he would not allow the Chinese Expeditionary Force from Yunnan to advance. If they were not to advance, I could not risk leaving the 26th Indian Division unsupported at Indaw. So three of the operations—An-

damans, Yunnan Force and Indaw—fell through. But far worse was to follow.

The Chiefs of Staff now sent a telegram saying that as the Generalissimo had cancelled the advance of the Yunnan Force there was no point in letting me keep any landing craft at all, and I was to send the remainder to the Mediterranean. So that finished that operation. I was virtually left with only two offensive operations—General Stilwell's advance in the Northern Combat Area and General Wingate's Long Range Penetration Force, which was being largely used in support of this advance.

The Revised Strategy

We now had to review our strategy. We came to the conclusion that the first task with regard to China was to help the 14th U.S. Air Force, which was doing such admirable work under Major General Chennault in sinking Japanese shipping off the China coasts. To do this it would be necessary to improve the air route over the Himalayas (colloquially known as the "over the Hump"). Second, we came to the conclusion that we should give the highest priority to building the very long and very strong airfields needed for the B-29 Super-Fortresses, 100 of which (known as the 20th U.S. Bomber Command) were expected to be operating shortly from my theater. Third—and from our point of view, most important—I decided to adopt the suggestion put forward by Major General Wedemeyer to push through to Singapore quickly and open a port on the China coast where one Liberty ship could bring in at least as many supplies as could be taken by road into China in a month. We felt that if we went cautiously and confined our activities to seizing and constructing airfields in the Myitkyina area we should have enough land and air forces to spare for this operation, provided we could receive back our own landing ships and landing craft

and provided the strength of our aircraft carriers could be built up.

I sent a mission under General Wedemeyer first to London and then to Washington. Their proposals were well received in London, but the Prime Minister instructed them to confine their remarks in Washington solely to Burma and not to refer to amphibious strategy. General Stilwell opposed this new move and, as has recently been disclosed by his Public Relations Officer in America, he sent his own mission to Washington without informing me. It arrived before our own mission and of course had no similar restrictions placed upon it. This has sometimes been represented as a cleavage between British and American policy, but you will note that both policies were sponsored by American generals. In any event, General Stilwell's mission won the day, and the American Chiefs of Staff recommended to the British Chiefs of Staff that I should be ordered to clear the whole of Northern Burma and to push a pipeline through to China.

I had given General Wedemeyer a second duty to perform, which was to appeal to General Arnold to let me have the greatest possible number of additional transport aircraft, because at that time we had only seventy-six, British and American. He was fortunately able to use the argument that the American Chiefs of Staff directive would in fact leave many of our troops in mid-Burma during the monsoon without any proper surface lines of communication, and that, in fact, their policy could only be carried out if they gave us adequate air transport. As a result, General Arnold promised to set up four special combat cargo groups, each of 100 C-47 Dakotas or of eighty C-46 Commandos (equivalent to 120 Dakotas), on condition that I could prove that I really needed those transport aircraft to carry out these operations. So the visit was not unfruitful.

Now let us consider the situation at

the beginning of February 1944. Our XV Corps had been holding back to allow the 2d Division to land behind the Japanese 55th Division on the Mayu Peninsula. When this operation was cancelled in January, I gave orders for the advance to start, and General Giffard ordered them to push on to the Maungdaw—Buthidaung line.

The Japanese Offensive

This advance had not been very long in progress when, on 4 February, the Japanese started an offensive of their own. They sent a force of some 7,000 or 8,000 up the Kalapanzin Valley, and then struck west and south, encircling the 7th Indian Division. Meanwhile, the remainder of the Japanese 55th Division made a frontal attack.

In the past, whenever the Allied lines of communication were cut, the Japanese had found that our forces had immediately fallen back and fought a battle at the point where the communications were cut in order to reestablish them. If at this time the Japanese could cut our communications a second time nearer our bases, the Allies would fall back again. So a technique to force us to retreat had been evolved. General Giffard, General Slim and I were determined that this should cease. Our policy was that if troops were cut off they were to "stay put" and we would supply them by air.

Meanwhile, the Japanese were carrying out fighter sweeps with fifty to sixty fighters at a time over the Arakan front. We estimate that they lost up to 200 aircraft in this series of battles—the first serious blow to Japanese air power in South-East Asia. I got the U.S. Chiefs of Staff's permission to borrow a transport squadron off the "Hump" and our troops stood fast, supplied by air, and won the first victory in South-East Asia.

One would have thought that the Japanese would have learned their lesson in the Arakan battles, but not a bit of it.

They now repeated the same mistake on a much greater scale, for the Japanese 15th, 31st and 33d Divisions proceeded to adopt the same technique against IV Corps on the Imphal front a month later, on 8 March.

It was clear to us that we must move at least one division from the Arakan to the Imphal front at once, but to send it by road and rail would have been far too slow, and unfortunately we had no transport aircraft to spare to move them by air. In the case of the Arakan attack, I had obtained the permission of the U.S. Chiefs of Staff to borrow a squadron of transport aircraft from the "Hump," but on this occasion I could not afford to wait for permission and I gave orders on my own responsibility, although I had had orders from the President not to touch the "Hump" traffic without his permission. He, very generously, supported this action.

We also came to the conclusion that XXXIII Corps, which was now no longer needed for amphibious operations, should be sent as quickly as possible to support IV Corps.

It now became clear that we were going to require air supply on an unprecedented scale. The whole of IV Corps was now cut off in the Imphal Plain; the Manipur road was cut at Kohima in the north, and the Bishenpur trail in the south-west—the only other one—was also cut. We worked out that we wanted at least seventy more transport aircraft, and I asked if these could be taken off the "Hump." This request was refused, although I was told that I could keep what I had already taken off the "Hump" until June, and that the remainder would be sent to me as soon as possible from the Middle East and the United Kingdom. In the meantime, General Arnold informed me that the first combat cargo group of 100 Dakotas would arrive at the end of June. I put in an urgent demand for the second group to

follow as quickly as possible, and this, too, was accepted.

My planners now worked on the basis of having all the 400 combat cargo aircraft before the end of the year, but before General Arnold would send the remaining 200, he required us to submit a firm plan for their use. Before we could do this, we heard that General MacArthur had put in a bid for the last 200 and they had been allotted to him. I immediately appealed to General Arnold against this decision and he finally decided to split the difference and to give us each 100. Thus I finally received from him 300 transport aircraft instead of the 400 on which we were planning.

On 22 June—that is some six weeks after the monsoon had started—the Manipur road was opened and XXXIII and IV Corps joined hands. Although the monsoon was in full swing, my policy of fighting on, marching on and flying on throughout it was faithfully carried out. There is no doubt that the last thing the Japanese expected was for us to advance in the monsoon.

Let us turn now for a moment to General Stilwell's front. I had told him to advance to the Myitkyina—Mogaung area and he was now making good progress against the Japanese 18th Division (veterans of Singapore). He was receiving excellent air support from the 10th U.S. Air Force. I had given him the American Long Range Penetration Regiment, which General Marshall had given me to join General Wingate's forces. Wingate had trained them and Stilwell now used them for a remarkable forced march over the Naura-Hyket Pass of the Kumon Range. They descended on Myitkyina airfield and took the Japanese completely by surprise on 17 May. Although the monsoon had started, American engineers, Chinese reinforcements and British AA artillery, were immediately flown in. It was as disappointing to him as to me that it took

him another seventy-nine days to complete the capture of the town.

At the end of April 1944, the President, at General Stilwell's urgent request, sent a telegram to the Generalissimo and succeeded in persuading him to allow the Chinese Expeditionary Force to advance from Yunnan.

On 16 June, General Stilwell reached Kamaing and demanded that I should implement the Cairo agreement, by which he would now come under my direct command. This made me commander in chief of the Allied Land Forces and upset the tripod arrangement on which I wished to base my command, for I now found myself having to deal with purely army problems, such as deciding boundaries between corps and adjusting the rates of advance of neighboring forces. I have no hesitation in saying that in a theater where the land forces do not exceed the size of an army group, it is the greatest mistake for the Supreme Allied Commander also to be the commander of the land forces.

Meanwhile, General Wingate's operation was taking place. The 16th Brigade started their long and weary march in on foot on 5 February on the western flank of General Stilwell's advance. Four other brigades were flown in, two on 5 March and two on 22 March. The sixth and last brigade was used to cut the Japanese communications behind Kohima at Ukhrul, under XXXIII Corps. General Wingate himself was unfortunately killed in a flying accident on 24 March, but his gallant forces carried on, fighting behind the Japanese lines.

Command of the Sea and Air

By the summer of 1944, we had complete command of the sea and air throughout the theater. Destroyers had arrived at the end of March, which had enabled the fleet sweeps to start. During April, American, Dutch and French ships had joined the Eastern Fleet. The policy at this time was to deny the Indian Ocean to the Japa-

nese, cutting their sea communications and forcing attrition on the Andamans. At the same time, Naval Air Arm strikes and bombardments were to take place against military and oil installations in the Netherlands East Indies, and they were to give the Army in Burma the maximum possible support. In May 1944, they carried out their first long operation against the Sourabaya refinery, spending twenty-two days at sea.

Command of the air came to us chiefly through the arrival of Spitfires and long range fighters, such as the P-38 "Lightnings." Indeed, this command of the air was a necessary prerequisite to being able to embark on really large scale air supply.

The New Directive

On 3 June, I received my new directive from the Chiefs of Staff. Paragraph I was identical with what I had suggested to them in April, namely, to develop, maintain, broaden and protect the air route over the "Hump" into China, but a new paragraph was added which instructed me to press advantages against the enemy and to be prepared to exploit the development of overland communications with China. All these operations were, as usual, to be carried out with the forces I already had in the theater. So far as I was concerned, this meant that we had to conquer most of Northern Burma, and really it meant that we should have to go on and liberate the whole of Burma.

We, therefore, produced two plans, "Capital" and "Dracula." "Capital" was to be an advance by Fourteenth Army, which now consisted only of IV and XXXIII Corps, since XV Corps had been put directly under Eleventh Army Group. They were to cross the Chindwin and deploy their armor against the enemy in the Yeu-Shwebo area, with subsequent exploitation to Mandalay. Airborne troops were to seize Kalewa, while a second landing was to be made at the entrance to

the Mandalay Plain. General Stilwell's Command and the Chinese Expeditionary Force were to undertake a complementary advance to the south.

"Dracula" was the recapture of the Rangoon area by a combined airborne and seaborne assault to cut the main Japanese lines of communication. If the enemy reacted strongly, our northern forces would be able to advance against reduced opposition, but if there was no strong reaction, the seaborne and airborne forces would be able to advance northwards in conjunction with other operations to open the road to China. For the latter operation, additional reserves would, of course, be required from the United Kingdom.

I went to London in August 1944, and put these plans before the Prime Minister and the Chiefs of Staff. I received their fullest approval, but they pointed out that the additional resources for "Dracula" could only be made available if Hitler were defeated by October, as was at that time thought likely.

In November 1944, there was a tremendous reshuffle in the higher appointments. The Generalissimo and General Stilwell parted company, the latter being given another appointment in the United States. This resulted in General Wheeler becoming my Deputy Supreme Allied Commander, General Sultan, who had been General Stilwell's Deputy Commander, now became Commander of the American Forces in India and Burma, and succeeded to the command of the Chinese armies in India and Burma. My Deputy Chief of Staff, General Wedemeyer, went to China to be the new Chief of Staff to Generalissimo Chiang-Kai-Shek, and to be the Commanding General of the U.S. Forces in China. Meanwhile, Lieutenant General Sir Oliver Leese arrived to take up the new appointment of Commander in Chief Allied Land Forces, South-East Asia, Eleventh Army Group Headquarters being taken over by him and expanded to include a

small proportion of American staff officers.

When General Wedemeyer arrived in Chungking, he discovered that over a period of five months the Japanese had advanced 500 miles from Yochow to Liuchow, and that having gotten to Liuchow they were threatening either the capital, Chungking, or the vital "Hump" terminal, Kunming, the fall of either of which would have been so disastrous as probably to throw China out of the war. General Wedemeyer immediately telegraphed to me asking me to send him two Chinese divisions, three combat cargo squadrons, two troop carrier squadrons of the Air Commandos and some heavy bombers. He repeated this demand simultaneously to the Combined Chiefs of Staff. Although the loss of these forces could not fail to have a very serious effect on my own operations, I realized that my own operations were in fact directed towards helping China and that they would all be in vain if China were forced out of the war. I, therefore, immediately agreed and gave orders for the moves to start.

The first effect of these moves was to cause the cancellation of the airborne part of "Capital." The second effect was to slow up the whole Fourteenth Army for lack of aircraft. The third effect was to upset General Sultan's military plans by the withdrawal of a large proportion of his land forces.

In the meanwhile, not only the Japanese in China, but the Germans in Europe were interfering with our plans. Hitler had failed to stop fighting in October, an estimate on which our plans were based, and the result was that it was impossible to get the divisions we had been looking for from the United Kingdom. The British-Indian divisions could not now be released from Italy and the whole of Operation "Dracula" had to be cancelled.

In order to have some troops for further amphibious operation, it became imperative to release XV Corps from the

Arakan front. Another reason—which in fact was of even greater importance—was that we needed air bases farther to the south from which the air supplies of Fourteenth Army could be kept up as they advanced to Rangoon. Our existing air bases were all in Assam, and as a Dakota can fly only 250 miles there and back with a useful load, it was essential to get airfields within this range of Rangoon. Akyab and Kyaukpyu in Ramree Island fulfilled these requirements. We, therefore, pushed on with the operations to clear Arakan. This was with the approval of the Chiefs of Staff, though they told me I was not to plan further amphibious operations until I was quite certain that the situation was clear in Burma.

In January 1945, the situation was that Fourteenth Army was across the Chindwin and that XV Corps had taken Akyab unopposed, since the garrison had come out battalion by battalion to try to stem the advance. At the end of January, the road to China was opened, General Sultan's forces meeting the Chinese Eleventh Army Group between Wanting and Namhkan. I was then able to report to the Combined Chiefs of Staff that the first part of my directive had been completed.

Meanwhile the Assam lines of communication had fortunately reached their target, and were in fact handling more than 7,500 tons per day. At the end of January, General Leese and General Stratemeyer had worked out that they could not do without the extra 100 aircraft which our original plan had allowed for. Air Marshal Joubert told me he required forty aircraft for feeding the civil population. The Chiefs of Staff undertook to let us have 145 transport aircraft, five more than we asked for. In view of our low priority, this was indeed encouraging.

Unprecedented Air Supply

The aircraft started coming out to us, and we gradually built up the largest

scale air supply that has ever been seen. It was not just a question of auxiliary air supply, because ninety-six per cent of our supplies to the Fourteenth Army went by air. In the course of this campaign we lifted 615,000 tons of supplies to the armies, three-quarters of it by the U.S. Air Force and one-quarter by the Royal Air Force. Reinforcements totaling 315,000 were flown in, half by British and half by Americans. Some 110,000 casualties were flown out, three-quarters by the British and a quarter by the Americans. In our best month, March 1945, we actually lifted 94,300 tons. During that time the American Air Transport Command was building up its "Hump" traffic, so that by July they had reached their peak of 77,500 tons per month.

We had only about half the aircraft that were really required, but we made up the other half by the expedient of flying almost double the number of hours allowed for sustained operations. Normally, this would be considered an extremely dangerous policy, but we had no alternative. Although there was the gravest risk that the whole of the air transport arrangements might break down, they could see the results of their supplies in the daily advance towards Rangoon, and their morale was so high that they somehow managed to carry on. Nevertheless, I do not recommend that any plans should be made which entail aircraft working at over-sustained rates. I cannot pay too high a tribute to all the Allied Air Forces for their magnificent achievement, which I do not believe has been equalled in war.

On 3 February 1945, I got a new directive from the Chiefs of Staff to liberate Burma at the earliest date and, subject to this, to liberate Malaya and open the Straits of Malacca. I was told to accomplish the liberation of Malaya with the forces at present at my disposal, though they hoped to dispatch further reinforcements from the European Theater

should the situation render this possible.

I examined a suggestion that we should go through the Sunda Straits, but had to reject this because the Fleet Train had gone to the Pacific and the East Indies Fleet could not operate so far from its base for any length of time. We decided that we could afford to by-pass the Andamans now that the Japanese air and sea power had dwindled, and to go right on to Phuket Island, where we could set up bases, as a stepping stone towards Malaya. This was to be done in June, and as the landing craft were beginning to come out, we all felt very optimistic.

I should like to stress that my object in South-East Asia was always to recapture Singapore before the Japanese were forced to surrender. This object I kept constantly before my commanders in chief, and now that the war was beginning to speed up, I was determined to get to Singapore before the end of 1945.

Recapture of Mandalay

Let us review the general situation in Burma in March. Fourteenth Army had now crossed the Irrawaddy. Incidentally, the Irrawaddy is five times as wide as the Rhine, and it must be remembered that we had none of the facilities for crossing rivers which the armies in Europe had. The Prime Minister had been able to announce in the House that Fourteenth Army had recaptured Mandalay. The XV Corps had done a series of brilliant amphibious assaults on the Arakan coast, seizing in succession Akyab, Myebon, Ramree Island, Kangaw, Ru-ywa and Letpan. The Myebon assault was ordered and carried out within seventy-two hours. The Eastern Fleet, on their own, captured Cheduba with the Royal Marines. All the XV Corps assaults had to be carried out through *chaungs*. These *chaungs* are inland waterways which the Navy had not charted. The only information available about them was that shown on military maps, and when one tries to navigate

waters relying solely on military maps, one realizes what a grave risk the Navy was taking!

It was at this stage that it again became the turn of the Chinese to deal us our next routine blow. This time it was a serious threat of famine, and in order to relieve the famine the Generalissimo considered it necessary to reconquer vast areas of paddy fields to produce the necessary food. General Wedemeyer, therefore, asked me to send the American Mars Brigade (which had relieved Merrill's Marauders) and the remaining three Chinese divisions, as well as all American air transport aircraft to China. I flew up and saw General Wedemeyer at Calcutta on his way to Washington, and then flew on to Chungking to see the Generalissimo. After a series of talks we eventually hammered out a plan which I could just manage without finally wrecking all prospects of Fourteenth Army getting to Rangoon. I agreed to send back the American brigade to act as instructors to the Chinese and to pull out the other divisions as fast as the transport aircraft of the Fourteenth U.S. Air Force could take them. In the Mars Brigade were the only Americans we had fighting on land, and although they fought gallantly, they required so much more air supply per man than a Chinese soldier that General Sultan agreed that they should be the first to be moved. I absolutely dug in my toes about releasing any further transport aircraft until we had reached Rangoon, which I prophesied would be by June.

The Occupation of Rangoon

In May 1945, owing to these various incursions into our resources, General Sultan's thrust had been once more held up and it looked as though General Slim was not going to get to Rangoon before the monsoon. We, therefore, finally decided to sacrifice our amphibious operation against Phuket Island and to take

Rangoon by a simultaneous airborne and seaborne operation. The operation was carried out at the last possible moment. The airborne attack was on 1 May, to seize the shore defenses at the mouth of the Rangoon river, and "D" day for the seaborne assault was 2 May. Believe it or not, as the first soldier put his foot on shore, down came the monsoon—ten days earlier than usual.

My opposite number—the Supreme Commander of the Japanese Expeditionary Force of the Southern Regions, Field Marshal Terauchi, had given strict orders that in no circumstances were the Japanese to vacate Rangoon; they were to stay and die defending it to the last man. General Kimura, however, took no notice of his Supreme Commander's orders, and, fortunately for us, vacated Rangoon.

The Japanese Surrender

The serious consequence, of course, was that the operation to take Phuket Island (Operation "Roger") had to be postponed for six weeks. As the war was speeding up, I felt we could not afford a six weeks delay and I decided to take the risk of cancelling "Roger" and of going straight to Malaya. This invasion of Malaya was called Operation "Zipper." "D" day was to be 9 September, but on 15 August the Japanese surrendered at the precise moment when a quarter of a million men with their equipment were being loaded for "Zipper." We now know that "Zipper" could not have failed, for the Japanese had only 130,000 (of their three-quarter million in South-East Asia) to oppose us in Malaya. They did not know when or where we were coming; all they knew was that their intelligence had said we could not come during the monsoon, that is, not until November.

The Japanese, themselves, estimated that they lost over 190,000 dead in the Burma campaign. We took only 3,000 prisoners of war.

An Explanation of the Battle of Stalingrad

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel A. Archard-James in "Revue de Défense Nationale" (France) February 1947.

ALTHOUGH we are unable to evaluate fully the gigantic conflict just ended, all are agreed on the decisive character of the battle of Stalingrad. It was a turning point. After an unbroken succession of victories of Poland, Norway, France, the Balkans and North Africa, the *Wehrmacht* began, in the fall of 1942, to experience the reverses which in thirty months led to final catastrophe.

The losses suffered on the banks of the Volga are often offered in explanation of the apparent inability of the Reich to resume the initiative in operations after General von Paulus' capitulation. It is quite probable that this disaster, following the winter campaign of 1941-1942, dealt a mortal blow to the depots and stores of the *Wehrmacht*. As far as we are aware, the effort has never been made in France to discover the causes for this six month struggle by the two most powerful armies in the world, nor why it took place in such a confined area as Stalingrad. The explanation offered here is purely hypothetical. The documentation, however, for converting it into historical fact, doubtless exists in the archives of the *Oberkommando der Wehrmacht*.

At the beginning of 1942, the war map eminently favored the Reich. In the west, occupation of the Atlantic coast permitted the German submarine fleets to deal heavy blows on Allied convoys. It also permitted massed air attacks on vital British centers. The Atlantic wall appeared to defy all attempts at landing.

The rapid campaign of the Balkans, started in April, had in less than three weeks given the Reich control over them. In Libya, the British had resumed the offensive but, during the course of the summer, Rommel was to push as far as the gates of Cairo.

The United States had not yet completely recovered from the Pearl Harbor disaster. It was slowly organizing and did not yet constitute a threat.

The principal concern of the *Wehrmacht* was the eastern front. In the spring of 1941, Hitler suddenly abandoned his preparation for the invasion of Britain and turned toward the east. During all of 1941, he attempted to crush the Soviets,

Winter arrived to take the initiative from the *Wehrmacht*, for the Soviet Army continued undiminished activity.

In the spring of 1942, the program appeared to be quite the same as in 1941. Russian strength increased during the summer campaign. Their aggressiveness during the winter showed that their strength had continued to increase and their defeats had not affected their morale. Logically, the campaign that was about to open, should be a continuation of the preceding one, aimed at destruction of the power in the east.

During the winter of 1941-1942, the German-Russian front had become practically stabilized on a line extending from Leningrad to Sevastopol, both under siege, and passing by way of Lake Ilmen, Rzhev, Orel, Kursk, Belgorod, the Donets which covered Kharkov, and Taganrog (all of which points were solidly held by the *Wehrmacht*), and the Strait of Kerch between the Sea of Azov and the Black Sea.

After mid-April, the Russians unleashed a violent offensive in the Kharkov sector, probably to retake this city, but also to disorganize the threat which was felt to be close at hand. This offensive, successful at first, was brought to a halt, and then repulsed, by the German counteroffensive which restored the *Wehrmacht's* winter positions on the Donets. While this portion of the front appeared to become static, on

8 May a German-Rumanian attack was begun in the Crimea. Kerch fell on the 15th and Sevastopol fell a month and a half later.

On 25 June, the Germans began their summer campaign. On 28 June, the whole front, from Kharkov to the Sea of Azov, advanced. One breakthrough south of Kharkov was rapidly brought to a stop and then pushed back. The second north of Kharkov, in the direction, Kursk-Voronezh, was a complete success. The Don was reached at Voronezh on 7 July.

There followed a remarkable exploitation of this breakthrough. Part of the German forces swung southward, following the Voronezh-Millerovo railway line, and then the lower course of the Donets to its confluence with the Don. There it divided into two parts, one proceeding up the Don to be stopped before Zymliansk, while the other moved down the river to Rostov.

The second group, having reached the Don, did not attempt to cross it immediately, but rapidly descended the river. When opposite Kasansk, a few elements crossed the river and continued on to attack Tchelanskaia. The main body, continuing along the river, ran into the Russian bridgehead anchored on the Don at Tchelanskaia and Kalatch and covered by the Tchir.

Profiting by the disorder that had been produced in the Soviet rear areas by the preceding operations, a breakthrough succeeded south of Kharkov. It descended the Donets as far as Voroshilovgrad and, boldly striking off southward, attacked the defenses of Rostov from the north. The two actions from the east and north converged on Rostov with an attack from the west starting from Taganrog.

Immediately two movements were started, one from Rostov toward the south and the southwest, the other towards Stalingrad with direct action against the bridgehead on the Tchir and two flanking move-

ments north and south of the Don bend.

A new group of armies was introduced which crossed the Don above Rostov, gained the railway line running from Krasnodar to Stalingrad by 1 August, and then burst out in three directions from Rostov: (1) toward Novorossisk; (2) toward Armavir, Maikop and Tuapse, to obtain possession of the Kuban oil; and (3) toward Baku.

Krasnodar fell quite soon, but Russian resistance was strong on the shore of the Sea of Azov and Novorossisk did not fall until 19 October. Maikop and its oil fields fell on 9 August. The Germans, however, failed to get Tuapse. In the third direction, progress was extremely rapid. Stavropol fell on 4 August, Piatigorsk on the 10th, and the Terek river, 600 kilometers from Rostov, was reached on the 24th. On 6 September, three bridgeheads were established on the south bank of the Terek, but German success was not to go any farther. They were blocked in front of the Grosny mountains which covered the wells of this important oil region. After the capitulation at Stalingrad, this group was obliged to retreat as rapidly as possible toward the north.

Around 15 August, the Germans detached a column in the direction of Astrakan. It was reported at Elista, and that was the last mention ever made of it.

While the southern group of armies crossed the Don and began its drive toward the Caucasus, the group to the north attacked the Tchir bridgehead. The objective was clearly evident. The communiques issued by both sides spoke of the battle for Stalingrad. The Russian Army held firmly to Kletskaia, but still more stubbornly to Kalatch, where the railroad crosses the Don. These two anchor points fell between 12 and 17 August, and the *Wehrmacht* crossed the river around the 24th. The few elements which had followed from Kasansk, on the left bank, circled around Kletskaia on the

north, and established a defensive front between the Don and the Dubovka, thirty kilometers north of Stalingrad, on the Volga. It was a cover which appeared to be very thin. On the south, the cover was no better. It was limited to the occupation of Kotelnikovo on the railway which ran from Krasnodar to Stalingrad and appeared to exist for holding this railway.

The siege of Stalingrad then began. There is no need for recalling its fluctuations. It is sufficient to say that the *Wehrmacht* was not content with occupying the strong defensive positions from which it would have been able, at less cost, to maintain control over the Volga. It continued on the offensive until, in December, the German Sixth Army, comprising some twenty divisions, pressed on every side, was forced to capitulate.

During this entire battle, the front north of Kharkov was active. Fighting had been particularly severe before Leningrad and Moscow, but nowhere was it so savage as at Stalingrad.

After the surrender of the Sixth Army, the Germans never again obtained anything but local and temporary successes. Save for the offensive of July, 1943, in the Kursk area, and von Rundstedt's offensive in the Ardennes during the winter of 1944-1945, the *Wehrmacht* was thenceforth to remain on the defensive.

What is now to be said is, to a large extent, hypothetical. It is only a possible explanation of the observed facts.

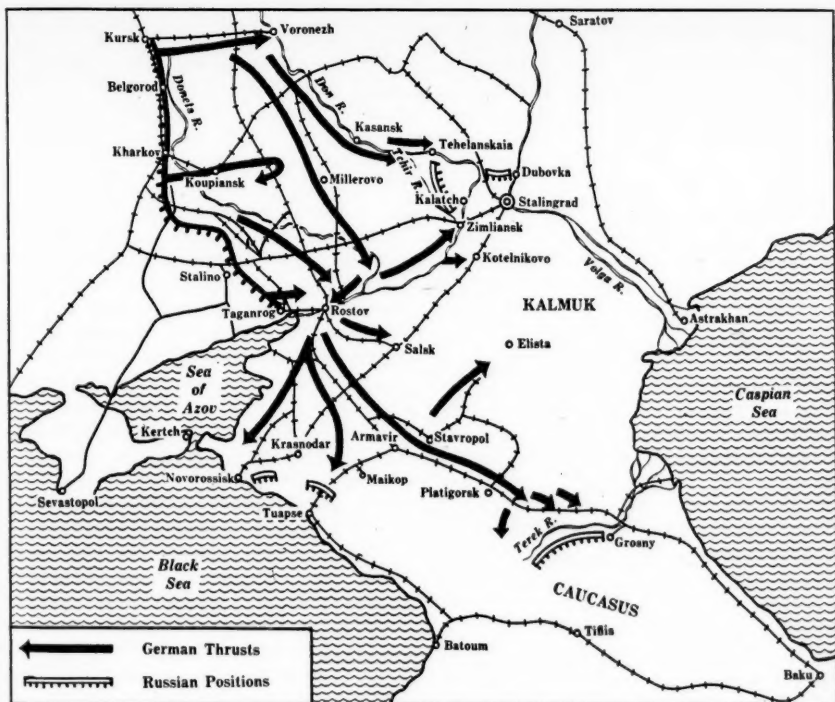
Beginning with the winter of 1941-1942, the threat to the *Oberkommando der Wehrmacht* was the lack of gasoline. The Balkan campaign cost much fuel. The Russian campaign was not the pushover that had been anticipated. On the contrary, it required the engagement of all the large units not required to guard the Atlantic front, for the occupation of Europe, and the Libyan campaign. The front was never quiet. It was necessary to supply, reinforce, and move enormous forces over very

long communication lines. This swallowed up huge stores of gasoline. If fuel consumption in 1942 was to continue at this rate, the situation would become critical before the end of the year. The capture of Rumanian oil and increased production of synthetic gasoline did not meet the increased needs.

Although the Russian danger remained the same as in 1941, the campaign of 1942 could not have as its objectives, as in the case of the preceding campaign, the destruction of the Soviet Army and the cities of Moscow and Leningrad, but rather the conquest of oil at Baku. The scarcity of fuel was already so great that movements of any importance over highways were not only to be avoided, but could not even be anticipated. All gasoline was to be reserved for the immediate combat requirements of the *Luftwaffe*. The trucks and other mechanized equipment, which for three years had rolled across Europe, were a thing of the past.

The Baku highway passed through Rostov, point of origin of all the railways of the Caucasus. Rostov had been occupied in July 1941, but had to be abandoned, and this experience had borne fruit. A bold attack had pushed an armored group close to the city. A counterattack transformed this success into disaster, and the Russian newspapers had published the impressive photographs of the Rostov tank "graveyard." The Germans, therefore, were not to attack Rostov till they had assured themselves of dependable cover on the north. The Donets would have sufficed if Rostov had been the only concern, but to cover a movement toward Baku, greater security would be necessary, and the Don, a truly serious obstacle, could provide this security. Moreover, occupation of the entire Don bend would permit another operation which appeared necessary, if the plan was to be carried out.

The aim was, therefore, well defined: effect a breakthrough, secure the protec-



tion of the Don, seize Rostov, and then drive to the oil fields.

For this reason, the army which effected the breakthrough made its way as rapidly as possible to the Don. In former times, it would doubtless have attacked the Russian rear and attempted a sweeping encirclement to crush the Moscow front from this excellent assembly position. The sudden turn it made, southward along the Don, shows that the intention was to limit action to the bend of the river and to seize Rostov, above all. If the breakthrough had occurred further to the south, an equivalent maneuver to the north would have been launched, but the fact that the Russian lines were broken through between Kursk and Voronezh shows the intent even more clearly.

The converging attack on Rostov proves the importance that was attached to it. As soon as cover on the Don was secured, the descent on Baku began from this sole communication center. Soviet resistance was very weak. It took but a few days to reach the Terek river. At that point a complete check of the advance by the solid Russian defenses south of the river occurred. In spite of its ability, the *Wehrmacht* was unable to effect a breakthrough.

For communication with the rear, the German Army had at its disposal, only one single-track railway line which had reached its full capacity. The railway was able to supply only about fifteen divisions. The *Oberkommando der Wehrmacht* had, however, foreseen the possibility of this

insufficient supply line and had planned other lines of communication.

South of the Caucasus there is a railway which carries oil from Baku to Batum on the Black Sea by way of Tiflis. Northward, following the shore of the Black Sea, it connects with the Kuban network. Squeezed between the sea and the Caucasus, it is very easy to defend. If Tuapse were reached, Maikop oil could be shipped by water, and the seizure of Batum would deprive the Russian fleet of bases. That was one of the reasons why serious resistance, assisted by the terrain, was found in this area, and the German attacks toward Tuapse failed.

North of the Caucasus was a suitable route—the Volga and the Caspian Sea. Its capacity was sufficient for an operation the size of the one to reach Baku. But how was Baku to be reached? Scarcity of gasoline was such that the Germans were not able to plan movements of any importance by highway. Even if there had been routes other than trails over the Kalmuke steppe, and if the shores of the Caspian Sea and the lower course of the Volga had lent themselves to the installation of sea or river bases, they could not have been used. The *Wehrmacht* was short of fuel.

If we examine the map, we see that in southern Russia the one point of contact between railway and water is Stalingrad. As soon, therefore, as the conquest of the Don bend had been completed and the principal action toward the Terek river was started, the *Wehrmacht* rushed on Stalingrad. The Germans doubtlessly hoped that the operation would be rapid and easy, for they organized it in limited form. It was so bound to the railroad that, on the north, cover was reduced to a corridor thirty kilometers wide. On the south, they contented themselves with seizing the railway which comes from Krasnodar but which also touches the Volga at Stalingrad.

Several times the Volga was reached, followed by those victorious communiques which gave the impression that the result aimed at had been attained—the cutting of Russia's communications by way of the Volga and the isolation of the Caucasus. Nevertheless, the *Wehrmacht* continued to attack. The cutting of the Russian communications on the Volga could not be a final objective, because, though it would have been troublesome for Soviet strategy, it would not have been a mortal blow. The Volga was paralleled on the east by a railroad which joined Saratov and Astrakhan, and was located far enough from the river that even if the latter were reached, the efficiency of the railroad would not be affected. But, above all, transportation of the Baku oil to the north was over a route far from the river. From Baku, the oil was transported by water to the eastern shore of the Caspian Sea, where a pipeline carried it to the Russian industrial centers and the north. (The action against Stalingrad has also been attributed to a desire for cover on the north for a movement toward Baku. This hypothesis does not seem to be tenable. Four hundred kilometers of Kalmuke steppes constitute a natural cover. Any threat from this direction could be neutralized by a striking force assembled in the Don bend, but would not justify the carnage of Stalingrad.)

Reaching of the Volga was, therefore, but a half-victory which the *Wehrmacht* was unable to exploit. Action had been on too limited a scale, and doubtless also the lack of means prevented an encircling movement around the north side of Stalingrad. The Germans were forced to exhaust themselves in frontal efforts contrary to their usual manner of fighting, for their adversary also realized the importance of this communication center. Resistance in the south, except for the cover for the Black Sea bases, had been fairly weak as far as the Terek river.

The Soviet Army took good care not to join battle on this railway, but awaited the battle at the end of the line, near its own bases, in positions solidly established on the hills south of the Terek river. Knowing the maximum capacity of the Rostov-Baku line, the Soviets were able to calculate with great accuracy the number of men and the amount of equipment required to hold their own with the *Wehrmacht*.

In the north, however, as soon as the winter front was broken, the Soviet Army clung desperately to the Kalatch bridgehead. It knew that the offensive operations of the *Wehrmacht* were limited to four or five months, and that every day gained was a victory. Repulsed on the left bank of the Don, the Russian Army established a new bridgehead before Stalingrad and then clung to the ruins of the city. The *Wehrmacht* pounded in vain. Here it was gravely handicapped by lack of communications. It was only by means of two railways that supplies could be brought up. The vicious circle the *Wehrmacht* had become involved in is easily seen: without possession of the communication center of Stalingrad there was no Baku oil; but also, without gasoline, there was no possibility of achieving superiority over the Russian Army. It might be observed that the Russians were no better off. That is true, if one considers the railway only, but the Soviet Army was never deprived of the Volga, whose capacity was considerable. Moreover, it was close to its bases. Factories are said to have continued

production at Stalingrad, and acute as the fuel question may have been for the USSR in the summer of 1942, the distances its trucks had to travel were immeasurably shorter than those facing the *Wehrmacht*.

It seems that the Russians had none of the difficulties experienced by the Germans in getting reinforcements to their bridgehead.

The capitulation of the Germans, capitulation in the field, proves definitely their distressful fuel situation. If it had been possible for the German Command to sustain them or to withdraw them, there is no doubt that more than 100,000 combatants of exceptional quality, and their valuable equipment would have been saved.

Stalingrad held. The gasoline route remained closed. From that time on, the *Wehrmacht* knew nothing but defeat or only local success. A few months later, the *Luftwaffe* was to lose its mastery in the air. The spring offensive of 1943 in Russia, and von Rundstedt's counteroffensive of December 1944, were rendered possible only by assembling, for the benefit of a few units, the whole of the available fuel supply. The operation in the Ardennes was the swan song of the Reich. The hosts of trucks and other mechanized equipment, which for three years had rolled across Europe, were now only a memory.

So it was, that Stalingrad, a secondary objective, became the crucial point for the war.

Modern Cavalry

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel A. Artalejo Campos, in "Ejército" (Spain) November 1946.

EVERY war presents different characteristics intimately related with the progress of science and industry. These characteristics were never so outstanding as they were in World War II, especially as regards shock troops and air forces.

Shock troops were made up in each country of mounted forces and mechanized and motorized units. The proportion of each varied according to available fuels, livestock, geographical characteristics and respective ideas about the employment and usefulness of the various forces. Therefore, while in Germany the shock troops were almost exclusively mechanized and motorized, in Poland and Russia the proportion of mounted troops was considerably greater.

During the war we saw two systems compete with each other—totally mechanized units versus mixed, mechanized and mounted troops. Neither system has proved itself absolutely superior to the other, for at times a surprising success of armor has been halted by a flank attack of other troops, in which mounted cavalry was usually present.

It seems logical, then, that if we are to establish some useful conclusions, they should be based on adopted procedures, the terrain on which the developments occurred, and the conditions under which each action took place.

The Polish Campaign

In view of later developments of World War II, we have largely forgotten the initial phase when the German troops invaded Poland, putting into practice their *blitzkrieg* with astonishing results.

Germany had a powerful army, perfectly equipped, with a high proportion of large armored units. Among its shock troops, the only mounted troops it had were some regiments employed for scouting and the

East Prussian Mounted Brigade, the only mounted formation that could be classed as a large unit. They possessed a good intelligence service, giving them freedom of action. With this army they achieved the defeat of Poland before it could receive help from its allies.

Poland, located between two powerful nations, was forced to take good care of its army. However, it was weak in armored units and antitank guns. Its shock troops were restricted to its cavalry units which lacked modern fighting means. They possessed great patriotism but their intelligence service was poor, and they over-estimated the help which their allies could give them.

The German penetration, and its enormous ground and air superiority, was aided by the loss of Polish morale. This loss of morale showed itself in the cavalry units in such a way that they did not launch any worthwhile attacks, although favorable opportunities were presented by the unprotected flanks of the German armored wedges. Normally, Polish cavalry attacked these wedges frontally, and when they decided to make flanking attacks, their morale was so low that the attack was weak and indecisive.

The German shock troops achieved such astonishing results that the disappearance of cavalry was predicted.

Western Front

Having finished the Polish campaign, the Germans started their preparations for the attack on the Western Front. The French meanwhile tried to study the lessons obtained from the experience of the Polish campaign and use them for the benefit of their troops. These lessons were:

(1) That the German success was due to launching an attack on a wide front which had no permanent fortifications,

and where geographic conditions were unfavorable for Poland; and the inferiority of the Poles in aviation, tanks, and anti-tank weapons.

(2) That the attack was launched with great fire preparation, specially air bombardment. When tanks penetrated the position, some attacked the Command Post, while others attacked positions which could not be attacked frontally. After the enemy line was broken, the armored forces continued their advance swiftly.

(3) That tanks breached the position by concentration in great numbers. They were given air support, and the objectives were attacked from the air by bombs and machine-gun fire.

(4) That mounted and mechanized cavalry of the reconnaissance units were used to advantage to gain contact with the enemy, search out the weak points in his positions, and to take part in active combat.

The study of the Polish campaign was of no avail to the French, in view of the disastrous military situation in which they found themselves as a result of the policies followed by their political parties for years. The Maginot Line was breached and the German armored troops followed the procedure previously observed.

When the Germans launched their attack on 10 May, France had, besides small reconnaissance units, the following large units of shock troops: four armored divisions, three lightly mechanized divisions (cavalry), and five cavalry divisions. It must be pointed out that the armored units were not up to par, almost completely lacking in reconnaissance units; only a few of their tanks were modern; and their artillery did not possess the mobility of that of the Germans.

The performance of these shock troops, like all the French units, was very poor. The cavalry, mounted as well as mechanized, was among the first to face the Germans. The five divisions together could have

offered great resistance to the Germans, but instead of fighting under a unified command, they covered the fronts of their respective armies and were defeated one by one. The French armored divisions did not distinguish themselves, either for their fighting spirit nor for their desire to cooperate. Like the cavalry divisions, they did not concentrate to forestall the German advance.

Eastern Front

Russian shock troops were composed of large armored and cavalry units. The armored divisions consisted of two tank regiments, one motorized infantry regiment, one artillery regiment, one reconnaissance battalion, and engineer, signal, and service units. These divisions were similar to those of the Germans. They also used, specially in the defense of Moscow, armored brigades made up of one tank regiment, one motorized infantry regiment, a mortar company, a reconnaissance group, and antitank and anti-aircraft groups.

The cavalry was partly mechanized. In the dilemma between the motor and the horse, the Soviets did not adopt the former, as most did, but decided on employment of both, coordinating their action and their effort. They based their decision on the following experiences and concrete facts:

(1) In World War I, the Russian cavalry was unable to prove its power due to the characteristics of the war and the limited ability of its generals.

(2) Cavalry forces should be employed in large units, and their proper use might be the key to success.

(3) The tank is not unduly dangerous for the cavalryman if he knows how to fight on foot as well as on horseback, and if he has adequate and modern weapons.

The experimental field for the cavalry was the 1917-1919 civil war in which cavalry was instrumental in deciding all battles.

The Russians organized their cavalry

divisions with four mounted regiments (five saber squadrons, one machine-gun squadron, and a light gun battery); a tank unit (three squadrons), a signal unit (two squadrons), a squadron of engineers, and forty-eight *tachankas* (small snowmobiles with machine guns). Total: 3,700 men, 3,553 horses, and 42 tanks.

Later, these divisions were reinforced with self-propelled artillery units and an increased number of tanks, according to their missions. The Russians are calculated to have had about thirty such divisions, or a total of approximately 100,000 men.

After violent German air attacks on the Russian airdromes to assure their air supremacy, three army groups crossed the frontier. The three army groups had light units, although in different numbers, according to their missions and the geography of their zones of action. For this reason, we find armored armies on the flanks of each of the two army groups of von Leeb and von Bock, while on the left flank of von Rundstedt's army group there was only the First *Panzer* Army and a cavalry division.

When the Germans launched their attack, the initial penetration was so deep that it seriously threatened the Russian armies deployed near the frontier. As a result, the Soviet High Command gave its cavalry the mission of delaying the German advance, so as to facilitate and protect the withdrawal of the remainder of the troops. The cavalry had difficulty in fulfilling its mission because of German air supremacy, but they were able to slow down the advance in certain sectors and avoid a defeat that seemed certain.

The German armies continued their advance, but suffered heavy casualties. For the first time, their armored forces had to recognize the importance of cooperation between tanks and cavalry.

The methods and procedures of Russian cavalry include the following:

(1) The best use of cavalry is on the flanks, and in exploiting the success achieved through penetration when the enemy front has been breached.

(2) In order to achieve success, the cavalry must take cover near the front, be resolute and active. The development and progress of aviation requires that the cavalry move mainly at night, especially in winter, when the snow shows up its movements and woods do not offer adequate concealment against air observation.

(3) When a cavalry division encounters enemy mobile forces (cavalry, mechanized troops or mixed detachments), it should not use complicated plans or wide maneuvers, but should employ its forward units aggressively, to prevent enemy maneuvers and to facilitate the entrance of its own main body into combat.

(4) In encounters with infantry troops, the command will try to prevent the enemy from deploying, attacking him quickly and, if possible, from several directions at the same time.

(5) If it is impossible to envelop the enemy front, and it is necessary to breach it, tanks should perform this mission, facilitating the advance of the mounted troops.

(6) In all cases, tanks should maneuver in close collaboration with the regiments of the first attacking echelon. They may be under the regimental commander or the division commander, but in any case the latter will fix the time and place for them to meet, so that he will always have them under control.

(7) Whenever possible, corps, and even armies, of cavalry should be organized with special tank units organic or attached to them. These units should not be distributed among the divisions, but should form part of the unit charged with the main effort.

The Norwegian Defense Policy

Translated and digested by the MILITARY REVIEW from an article in "Ny Militär Tidskrift" (Sweden) No. 3, 1947.

WITH the liberation of Norway and Denmark in May 1945, there arose a cry from all factions in those countries that a serious armament and defense program should be initiated so that they might never again be obliged to relive the humiliating experiences of 1940. Later, this attitude appears to have weakened somewhat.

Although Norway went ahead with some determination, the present situation is unstable. The government publication, *Arbeiderbladet*, stated in October 1946: "Norway, in the present situation, cannot remain a military vacuum." The reasons for this attitude were stated to be Norway's obligations to the United Nations, and her military and political situation on the frontier between the east and the west. This attitude is weakened, however, by a final tone of indulgence toward antimilitaristic tendencies. In a talk before the *Militære Samfund*, in Oslo on 7 October, Defense Minister Hauge expressed the view that, "most persons understand that the creation of a good system of national defense is a matter of national interest," but that he did not wish to conceal the fact that the expression, "Of what use is it?," is heard from time to time and that "certain groups exist in the country who are opposed to defense."

Undeniably, noteworthy steps have been taken in the direction of the establishing of a Norwegian system of defense. At the same time, it was necessary, during the first year, to overcome many difficulties, the principal one being lack of qualified leadership and the necessity of caring for German war prisoners. Also, the demands of the civil commonwealth have been very great. That the defense program moved slowly during the first year is, therefore, not surprising. During the last six-month

period, the military aspect of defense has assumed a much more solid form.

Norway's future defense is being worked out by a defense commission which began its activities on 23 September 1946. As a temporary measure, a plan has been worked out for an initial system of Norwegian defense, called the three-year plan. This aims at the creation of "a modern system of defense, to correspond with the requirements of the times."

Support of this plan is based on the following considerations:

The experiences of 1940 prove the value of modern war matériel and well trained troops. The Norwegian people's will to fight in defense of their liberty and independence, even against a visibly superior enemy, is a proved characteristic of their national psychology which is fundamental in the Norwegian defense policy. From the military and political viewpoints, relations between the great powers in the West and the Soviet Union are strained. "The United Nations, in themselves, provide no guarantee of peace." A defenseless nation between great powers creates insecurity, first for itself, and second, for general international politics. Norway, therefore, should display the will both to defend herself and to make the necessary sacrifices for such defense. It is stated that the Nation's real capital and national income are greatly reduced. The initial efforts in the creation of a system of defense will occur at a time when both the individual and the state are obliged to live economically. Lowered standards of living cannot be regarded as signifying that the nation lacks the ability to bear the cost of defense, yet a defense policy will not prove successful if it places obstacles in the way of reconstruction in other fields.

The three-year plan is based on a normal budget of 180 million kronor annually in addition to very considerable, initial appropriations for the acquisition of matériel. Of the 180 millions, eighty go to the Army, forty-four to the Navy, thirteen to the Coast Artillery, 27.6 to the Air Force, 5.5 to air defense and three millions to home defense. Defense training is to be of one year's duration. The Defense Department maintains that there must "be an end to short periods of training, or our military forces will be inferior to those of an eventual adversary." For the year 1946-1947, the total defense disbursements (inclusive of initial outlays) amount to nineteen per cent of the entire national budget. For purposes of comparison, defense appropriations in Denmark are fourteen per cent; Sweden 26.8 per cent; and Switzerland 47.5 per cent. The Norwegian defense appropriations are considerably lower than the Swedish, in spite of the fact that heavy expenditures for matériel are included.

The Norwegian three-year plan has already suffered retrenchments. Recently a considerable proportion of the contingents now in service were to be released on furlough. On closer examination it becomes evident, however, that this measure is not as sweeping as one gathers from the press. Of the class which has now been called to the colors (1946 A), an estimated 2,000 to 3,000 men out of 9,000 are to be sent home on furlough. Even next year's class (1946 B), will have a somewhat reduced period of training. The action may have been the result of extremely heavy disbursements for "developments," and in addition, the Norwegian-German Brigade likely has required very heavy disbursements—around twenty-five million *kronor*.

There are grounds for supposing that Defense Minister Hauge did not casually adopt this course which is indeed serious in view of the fact that the Norwegian

yearly classes are small and that every man capable of bearing arms ought to be given adequate training. The tendency manifested in this measure is likewise disquieting. It must have awakened feelings of anxiety in the Norwegian Command Corps, which is aware that its responsibilities are heavy.

Light is shed on the general situation by a bill recently submitted to the parliament and administration by Norway's Defense Union. It points out that the classes of 1940-1945, which had not been called into service earlier, were reduced to a training period of 120 hours. This would mean, it was stated in the bill, that in the event of mobilization, from 80,000 to 90,000 men would be without adequate training and could not be used in field formations. As regards the Army, this would mean that "after the expiration of the three-year plan, we would not have more than some 30,000 men fit for duty in the lines plus home-defense and reservist classes of 1939 and older." A Norwegian military writer has calculated that Norway will not be able to organize six fields divisions before 1959.

It should be observed that the Norwegian press has displayed but slight reaction in the face of this action of the administration, an attitude which indeed stands in contrast to its earlier position and which surely must attract great attention in other countries. One is also inclined to couple the administration's decree with passive Norwegian public opinion, and it strikes the outside observer that during the last year there has been a let-down in the Norwegian attitude toward defense. Sweden and other countries have believed in the earlier declarations and esteemed the determination back of them. The matter now boils down to whether the bitter experiences which resulted from Norwegian defense deficiencies in the spring of 1940 are to be ignored. If there is a let-down in the Norwegian at-

titude only two years after the liberation, how will matters stand when memories have grown still dimmer? A solid system of defense is not built up in a few years, unless there is systematic effort. This is particularly applicable to a country such as Norway which, after the end of the war, has but a weak military foundation to stand upon. A year ago, Defense Minister Hauge declared, "Our defense lies with a broken back." This declaration says a great deal concerning the defense situation in Norway. Now, if ever, a real awakening is needed, and an increase, not a decrease, in effort. In any case, the danger exists that in Norway there will

be created a military vacuum of the 1940 type, which will lead to international complications and a state of general insecurity in Norway.

Future events, only, can decide whether we should be inclined to optimism or pessimism. It is possible that the measure taken was only temporary, and that the Norwegian administration, in which there exists good timber, intends to hold fast to the original lines of conduct and build up a system of defense to correspond to the country's military and political situation and the Norwegian people's strong sense of freedom.

This war could easily have been prevented if the League of Nations had been used with courage and loyalty by the associated nations.

Even in 1935 and 1936 there was a chance, by making an armed Grand Alliance under the aegis of the League, to hold in subjection the rising furies in Germany, or at the very least to enter into armed conflict on terms far more favorable than those eventually forced upon us.

Winston Churchill

Tank Attack in Wooded Terrain

Translated and digested by the **MILITARY REVIEW** from a Russian article by Major General A. Belogorsky in "Krasnaya Zvezda" (U.S.S.R.) 27 December 1946.

THE advance of tanks through wooded terrain has a number of peculiarities. Forests limit the maneuver, not only of tank units, but also of individual tanks. The tempo of advance is, therefore, considerably slowed. Communication, control and reconnaissance are made difficult, because the commander can see only a few of his vehicles at any one time. Individual tanks often lose contact and direction, and are then forced to act independently.

It would, therefore, seem that it is better to use unecheloned tank formations, but experience shows that in breakthrough operations against enemy positions located in wooded terrain it is disadvantageous for the attacking tanks to employ a line formation. On encountering powerful antitank blocks and ambushes, tanks in line cannot always overcome them, because there is no continuity of effort which can be obtained from a formation in depth. If the tanks succeed in slipping through the position, the infantry advancing behind the tanks is held back by hostile fire, while the tanks may find themselves in the forest without any infantry support.

It seems to us therefore, that, in the attack of a strong defensive position in a wooded area, it is better to echelon all tank units. For repelling counterattacks and for the destruction of unsuppressed sources of resistance and machine-gun nests, it is desirable to have special reserves.

In attacking a strong position, tank units supported by infantry and artillery, break through the main lines of resistance and the centers of resistance immediately beyond. Not every frontal attack encountering strong resistance in the depth of the position can lead to success. It is advisable, therefore, to

find ways and means for envelopment.

Under normal conditions, tanks generally cooperate with the infantry very closely. A tank battalion attached to an infantry regiment is usually divided among the companies. Commanders of small tank units carefully reconnoiter the terrain, organize cooperation within the unit, and establish close contact with the infantry, supporting artillery, and sappers.

The difficulties of orientation in a forest call for careful selection of the direction of attack. Naturally, the most tempting are attacks launched along roads. But the direction of attack after the enemy has been defeated and has started withdrawing should be shifted, if possible, to roadless areas.

The reduction of road blocks and other obstacles in the forest calls for the presence of sappers in tank units. Inasmuch as the danger of a sudden attack by tank destroyers is always present in a forest, contact with the infantry should be intensified. It is advisable to attach about one squad of infantry and three or four sappers to each tank, and contact between them should not be broken. The sappers make paths through obstacles or mark passages through abatis, mine fields and other obstacles, thus securing the movement of tanks through the forest. Aside from saws and axes, the sappers should be equipped with mine detectors and explosive materials for demolishing trees.

A good example of offensive operations of tanks in wooded terrain is the battle described below. The Germans, surrounded to the west of Königsberg, offered strong resistance. Their defensive position consisted of several lines of deep trenches dug in the forest. This forest was defended

by two infantry divisions supported by artillery, tanks and assault guns. All roads and lanes in the forest were under fire. The forest was full of men armed with *panzerfäuste*. All intersections and main roads were mined. Tanks and self-propelled guns were emplaced at intersections and could, therefore, fire in several directions.

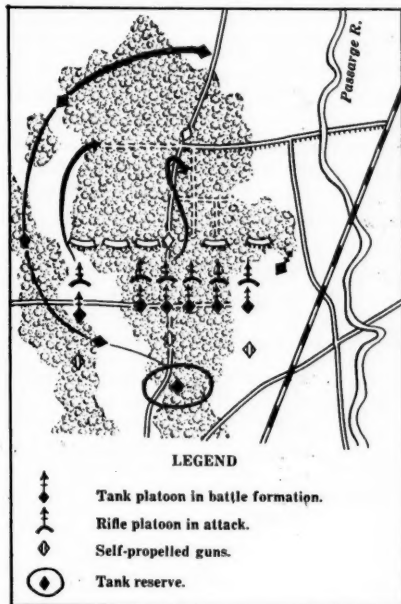
The mission of our tanks and infantry was to clear the forest of the enemy, advancing in a northerly direction, parallel to the Passarge River. With the assistance of artillery, the enemy was pushed off the main line of resistance, and the tanks, advancing through the forest with the infantry, took possession of the road intersection northeast of the swamp.

The scouts found that the enemy was defending all forest roads with the main body of his troops. The commander then moved his tanks along narrow lanes and over the swamp. By doing so, the tanks, self-propelled guns, and artillery of the enemy were bypassed and left on the road in the rear of the attacker. Fearing encirclement, the Germans withdrew their tanks, leaving on the road only machine guns and men armed with sub-machine guns. Against them we used a part of our tanks and self-propelled guns, as well as 82-mm mortars.

The following battle formation was used: Tank companies were divided into platoons. Each platoon moved in its assigned direction along a path or a lane. Leading tanks fired forward, while the rest fired to the flanks. Each tank platoon was supported by a platoon of infantry which moved 100 to 200 meters ahead of the tank. Inasmuch as there was danger of an attack by tank destroyers in the forest, each machine was protected by five to eight sub-machine gunners.

The sappers, advancing before the tanks and the infantry, were in close contact

with their machines and protected them by all possible means. At times, the tanks were within battle formations of the infantry. Whenever necessary, the infantry approached the tanks very closely and, personally or through the sub-machine gunners, pointed out targets for the tanks. Self-propelled guns advanced, in the main, along roads, edges of the forest, and through its openings. The most stub-



born resistance was encountered to the north of the swamp. The Germans counterattacked with tanks and assault guns. They moved, however, only along main roads and in columns, while our tanks, assisted by sappers, successfully advanced through the lanes.

Later, the scouts found a weak link in the defensive position of the enemy. The commander committed a group of tanks and his reserve. Concealing themselves behind trees, they made a wide envelopment and plugged all the exits from the

forest which might be used by the hostile tanks.

This maneuver decided the fate of the battle. Threatened by complete encirclement in the forest, the enemy began a hurried withdrawal to the eastern bank of the Passarge River. As a result, the Germans left their strong positions at the road intersections west of the river without offering resistance. They had not expected that our tanks would encircle their entire group (see sketch).

The bold decision of the commander to employ his tank reserve deserves attention. It was a sober decision, which took into account morale factors as well. When the Germans found that they might be locked in the forest, they began to withdraw.

The experience in this and other forest engagements shows that points along roads where the enemy offers resistance should be bypassed, thus threatening the enemy with encirclement in the forest.

The tanks advancing through a forest may be endangered by enemy attacks launched from flanks and rear. Therefore, flank security and the security of rear areas, as well as contact and liaison with neighboring units, assume paramount im-

portance. It is recommended that contact be renewed upon reaching the edges of woods, openings in the forest, and along paths and roads, employing various pre-arranged signals.

In securing flanks in the forest, anti-tank guns attached to tank units are of considerable help. Their crews should know which tanks they are to support, and the signals for requesting fire, transfer of fire, and cease fire.

The most acceptable tactics in attacks launched through a forest are envelopment and bypassing. It is desirable that the advance tank units not be engaged in protracted engagements, but bypass all the ambushes and abatis, wedging as deeply as possible into the dispositions of the enemy. In seeking routes for bypassing, considerable assistance can be furnished by dismounted reconnaissance elements. They can penetrate the hostile area unnoticed, ascertain unoccupied or weakly fortified intervals, and locate convenient approaches. Following them come separate combat machines and small tank units.

Excellent reconnaissance, careful organization of attack, boldness and vigor are essential for successful tank action in wooded terrain.

One of the first duties of any superior officer is to awaken in his subordinates, in time of peace, and by every possible means, the instinct of initiative, in place of banishing it from their minds as it is, unfortunately, so easy to do. The thing that must be combated without any restrictions is the habit of acting without an idea at all or without sufficient reason.

A Defesa Nacional (Brazil)

Personnel Selection in the British Army—The Other Ranks*

Digested by the **MILITARY REVIEW** from an article by Major E. W. Sheppard in "The Fighting Forces" (Great Britain) February 1947.

THE system of personnel selection in the British Army has now attained so high a degree of comprehensiveness and efficiency that it is in a fair way to being accepted as a model for other armies. America, Russia, France, Poland and Greece are among those countries in which our military selection methods have been studied, and to some extent, adopted. Recently, I visited typical centers at which this process is being carried out, and saw the organization and working of the system. This article will be concerned with the other ranks, and a subsequent one with the selection of candidates for temporary and permanent commissions as officers. The objects of the two categories of selection and the methods employed are somewhat different. In the case of the other ranks, each individual recruit is handled with the object of finding out which of the many available jobs in the modern army he is best suited for. In the selection of candidates for commissions, the primary aim is to find out whether they come up to the known and fixed standards for officers, though here again the question of allotment to the arm, branch, and appointment for which they are best suited also comes to some extent, into consideration.

In either case, the first essentials are to know what qualifications are required for each particular job and to assess the qualities and qualifications each individual possesses, so as to be able to dovetail the two to the best advantage of the individual and the service as a whole. The former is a matter of research, the latter is best achieved by a series of comprehensive reports, or alternatively in the case of a just-joined recruit, by a system of

selection testing. This system is carried out by personnel selection staffs, who are attached to primary training centers at home and overseas, and whose function it is to recommend the employment of the soldier on enlistment, and his reallocation, if necessary, to other employment at a later stage.

As soon as the new recruit reaches the army, he is sent for six weeks to a primary training center for his initial basic training, and during his first fortnight there the personnel selection staff carry out their selection tests. He first fills in a form giving full details of himself, his family, background, education, tastes, hobbies and interests, and employment prior to joining up. He is then given certain tests. These are varied from time to time, but when I saw the system at work there were five of them. First came the general intelligence tests, then a mathematical paper, followed by a paper of practical problems of a mechanical nature. The fourth paper is designed to test the recruit's ability to follow verbal instructions and check items of two lists one against the other; and the fifth is a simple literary paper to test his knowledge of English and power of writing.

Those who show special aptitudes in the mechanical and the English papers may be given two additional tests to see if they are likely to be suitable for the Royal Corps of Signals, or for one of the mechanized arms.

With the recruit's forms and the results of all these tests, the personnel selection officer proceeds to interview each of them. At these interviews, this officer tries to form a personal opinion of each man's qualifications, and to elicit, and, as far as possible, to satisfy such personal wishes or claims as any of them may have

* "The other ranks" is the British Army term for "enlisted personnel."

to be employed in some particular category, or be sent to some particular unit or corps. Basing himself on the results of all these tests and inquiries, the officer then makes three recommendations in order of preference for the eventual disposal of each recruit on completion of his primary training. But the actual decision, of course, cannot and does not rest with him, but with the manpower branch of the War Office, to which all the papers are sent.

Here, for greater speed and ease of handling, and to eliminate any possibility of influence or favoritism, the particulars of every recruit are entered on a card, which is then filed. These entries are so arranged, and the cards so stamped and punched, that all the cards of men with any particular qualification or set of qualifications required can be extracted by an ingenious mechanical device. Units and formations periodically render to the manpower branch details of their requirements in personnel, and when all these have been collected and tabulated under the various categories, the cards of recruits qualified and recommended to fill the existing vacancies are drawn out and a comparison made. Sometimes, though rarely, it happens that all the vacancies can be filled by candidates with "first preference" recommendations; but usually men with second, and perhaps even third, preferences have to be drawn upon. Thus, it does not always happen that a recruit goes to the unit or the job of his choice, or even to that which, in the opinion of the personnel selection officer, he is ideally suited. There may be no exact equivalent in the army for the job which he would like, and in which he has already had some experience or training. If equivalents exist, vacancies may be few and far between or much sought after, and in that case, those best qualified to fill them will get them, and those less well qualified must be utilized elsewhere. Again, there are often abnormal periodical calls for men with certain quali-

fications not usually in high demand; or certain categories may be filled completely and remain filled for long periods together. Neither the demands of the army nor the distribution qualification of the successive batches of recruits remain constant; the one must be adapted as best it can be to fit the other, and the allocation of recruits arranged accordingly. This is the job of the manpower branch of the War Office, and a very delicate, complicated and responsible one it is, for on it depends in no small degree not only the health, happiness and contentment of thousands of young men, but the efficiency of the army as a whole.

This process of allocation of each batch of recruits usually takes about a fortnight, and in the last fortnight of his six-weeks primary course the man, at another interview with the personnel selection officer, is informed of his final posting. He then goes on to receive his arms training at one of the initial training centers of the arm, and from there is in due course drafted to his unit.

Machinery exists for the re-allocation of misfits if necessary, and also for searching for and transferring from one arm or branch to another any man who, under training, develops unusual or unexpected aptitude, or displays specialist knowledge. Selection on the same general lines is also carried out in overseas theaters where the forces are expected, as far as possible, to find and train their own personnel in the way of specialists and technicians, though a good selection normally comes out in every draft from home. Personnel selection is thus a constant and continuous process, commencing with each recruit on his first arrival with the army and continuing, potentially at least, throughout his service right up to the day of his discharge. The results have proved it to be well worth the great amount of time, trouble, care and forethought devoted to

it. The danger of round pegs finding themselves in square holes can, of course, never be completely eliminated from any large-scale human organization, but it can safely be said that this is quite exceptional in the British Army of today and, in so far as it occurs, is due more to the congenital fallibility of the human factor than to any defect in the machinery for personnel selection. Moreover, this machinery is always under inspection and

review, so that, where such defects are suspected and reported, they can quickly be identified and remedied. The army does not profess or guarantee to put each and all its soldiers where they would like to be, or have asked to be; but in the great majority of cases it nowadays succeeds in placing them in congenial employment for which they are reasonably well suited and where they can be of maximum use to the service.

A French View of Nordic Strategy

Translated and digested by the MILITARY REVIEW from an article by Louis Tissot in "Revue de Défense Nationale" (France) January 1947.

RECENT events show that the great powers are locating their "war games" in the vicinity of Scandinavia. We have reference to the "phantom projectiles" over the Scandinavian Peninsula which appear to come from zones occupied by the Soviets. But we must also bear in mind the political evolution of the Faroe Islands, where a spirit of independence seems to coincide with the desire of the United States in deferring the evacuation of strategic bases in Iceland.

As for the "phantom projectiles," they have appeared to observers to be traveling at low altitudes and apparently capable of reaching targets 1,000 kilometers away. They appear to have been catapulted or guided by radio from bases situated at Petrozavodsk in Karelia, on the Estonian islands of Dagoe and Oesel, or Peenemünde which was an experimental station for the German V-1 and V-2 projectiles. According to the terms of a treaty between the U.S.S.R. and Poland in October 1945, the Soviets possess a five-year lease on the mouth of the Oder, and consequently control Stettin and the entire Swinemünde area where the Reich had established a testing ground for the atomic bomb.

Thus, the great rival powers appear to be closing in, more and more, on the Scandinavian peninsula.

The closest (from the military standpoint) are the Soviets. Their treaty with Finland and their occupation of the Baltic countries have given them choice bases for ground and naval forces. The no-man's-land of the Baltic area is now in their hands. They have pushed as far as the Oder and are located at Königsberg. They have obtained from Finland not only all of the southeastern area, but what is more important, the Petsamo area which establishes between Norway and the U.S.S.R. an unexpected frontier where the freedom formerly enjoyed at the frontiers has been radically suppressed.

This frontier stretches over a distance of 200 kilometers and is the same as that indicated in 1826 by the treaty which marked the boundary between Norway and the territory Petchenga. This frontier places the Soviets only a short distance from Lakselvans and Lyngsfjord and the ago-old dream of the Russians—access to the open sea. Operations here could place in Russian hands the whole of the northern edge of Finnmark with North Cape and ports such as Hammerfest,

which are important to all traffic between Spitzbergen and northern Europe. Moreover, in this sparsely populated area, effective resistance to an aggressor would be an impossibility due to the difficulties of maintaining a flow of supplies. The memories of Narvik are there to prove it.

Naval tactics of the U.S.S.R. in both the Arctic and the Baltic have passed beyond the defensive stage. With their new acquisitions, they possess under lease, in southern Finland, both the port and region of Prokkala; they occupy Dagoe and Oesel as well as Paldiski, which blocks the entrance to the Gulf of Finland. They possess ice-free Libau, important war port with its immense ship yards. Memel, a sandy port, is ideal for submarines of small tonnage. On the Baltic shores of Germany, the Soviets occupy Rügen and Hidensee; also the whole of the naval defensive system of East Prussia with the remarkable port of Peysa, built as an annex to the port of Königsberg a few years before the war.

All these possessions face the Swedish coast, which they appear to watch and encircle. It is none-the-less true that the Soviets have evacuated the island of Bornholm. This, however, in nowise interferes with their maintaining a deep interest in all matters pertaining to the Sünd and the Belts, as well as the Kiel canal. The Soviets are operating here differently than in the case of the Straits; their interest there is a different one. Though undeniably masters of the Baltic, they are attempting to maintain a watch over its exits. They remember that it was through the Baltic Straits that the Russian fleet, made ready at Kronstadt, had to sail out to its subsequent destruction at Tsoushima. They are fully determined that no other powers shall occupy these exits through which they might enter to attack the whole of the Russian Baltic area. That is why Russia is particularly interested in a restoration of the Lansing Plan of 1919 which

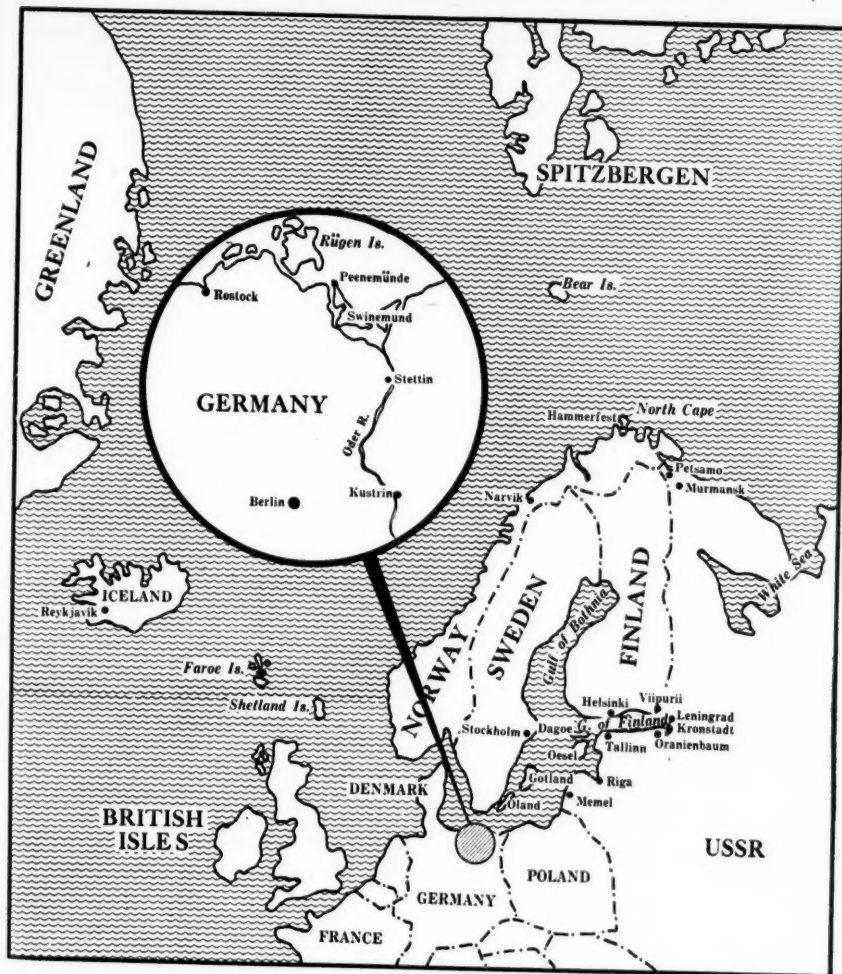
permitted her to destroy all the fortifications along the canal and to establish a neutral zone thirty-two kilometers in width on both the north and south side of the canal.

Since the disappearance of Finland from the Arctic, the Soviets have felt themselves to be closer to the Western World. They are very close to Kirkenes, Norway's northernmost port and center of the Sydvarangerfjord mining industries. The Soviets had, moreover, always had a threatening attitude toward Finland. In the treaty of Dorpat, though recognizing Finland's possession of the Heinasaaret Islands off Linnahamari, the Petsamo region, and the Arctic highway from Rovaniemi to Petsamo, the Soviets desired to make a certain number of demands of the new state of Finland. They forbade the latter to maintain war vessels in excess of 400 tons in the Arctic and they limited to fifteen the number of vessels of from 100 to 400 tons that could maneuver there. In addition to Petsamo-Linnahamari, the Soviets retained the two ice-free ports of Murmansk and Polyarnoe.

Though the U.S.S.R. may possess certain strategic advantages in the Arctic, it is none-the-less true that in a *blitzkrieg* these Arctic ports could be easily destroyed, which would deprive the Soviets of all free passage to the Occident. This operation would be the easier since these ports are very isolated and far from Moscow and Leningrad. Murmansk is connected with Leningrad by a single railroad line. Petsamo is connected by highway with Rovaniemi. As for the Baltic-White Sea canal (the Bielmorstroï), it is unsuited for the movement of large units and its course is very irregular because of differences of level. In the 227 kilometers between Povenetz and Soroka, there are more than twenty locks.

The entire Soviet plan of operations against Scandinavia is faced with great obstacles at the very outset. The greatest

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of all is the terrain itself. From Torneo to Hammerfest, the distance is around 550 kilometers. Two-thirds of this distance is covered with high mountains. In the north, it is possible to conceive a rapid occupation of Kirkenes (and even of Finnmark); in the south, in Sweden, that of certain localities beyond the Torne

Alv, Finno-Swedish frontier. Also this route is dominated by a height in the Swedish territory, back of which passes the strategic highway connecting Overtona with Tarendo. From the naval point of view, access to Stockholm on the Swedish coast is practically impossible in winter due to the ice in Bothnia Bay which

remains frozen for more than three months.

The Scandinavian ground defense network is situated between Boden and Narvik. Of the 200 miles which separate these two centers, Norwegian forces at Narvik would find it relatively easy to defend a front twenty to fifty miles wide. The central portion is easy to defend because of the terrain. As for the south, it is dominated by the fortress of Boden, the "Gibraltar of Sweden." Back of the Scandinavian line of defense, passes the so-called "mineral" railway which runs from Lulea to Narvik which it thus joins with Bothnia Bay by way of Boden, Murjek, Gallivara, Kiruna and Abisko. This railway is connected through Boden with Stockholm and through Gallivara with Oestermund. Another line, parallel to the "mineral line," joins the two perpendicular lines. It runs from Jörn to Arvidsjaur.

It can be said, with this system of defense, that Sweden is able to prevent any attack from the east by way of Torneokarungi and all landings on the western shores of Bothnia Bay through Lulea or Skellefte.

Toward the east, the approaches to Stockholm appear to be sufficiently well defended. The defense of the capital has been reinforced, since 1935, by the air base on the island of Gotland. But it must not be forgotten that today the U.S.S.R. is mistress of the Baltic and controls the western coast as far as the Oder; that Finland is practically under the control of Moscow, although some sentiments in the direction of independence are very distinctly noted, and these simple facts lead us to doubt any idea that a successful defense of Scandinavia is possible.

In any case, it may be considered that the vital region of Sweden, in other words, the one the Soviets would tend to occupy, is (aside from Stockholm) the northern region which supplies the entire country with minerals, timber and water power.

As a matter of fact, Sweden has never entertained any illusions on this matter, and General Jung has many times emphasized that Sweden cannot remain aloof from an eventual conflict. Taking for granted that Sweden is not strong enough to repel the attack alone, she would require outside aid and, above all, means for holding her own till this help arrived. That is why the last months have witnessed Sweden's occupation with pre-military training and para-military training. The age for service has been lowered from twenty-one to twenty years, which means the annual contingent will be increased by 40,000. It has been admitted that every Swedish citizen should be armed. On their part, Swedish war industries have continued their manufactures without slackening. Companies such as the Bofors, Husvarna, and Svenska-Aeroplan A/B, have retained their full manufacturing potentialities.

To be sure, in the matter of commerce, Sweden is engulfed in the economic *Lebensraum* which the Soviets have created since coming into possession of the Baltic. It is not to be wondered that the Anglo-Saxons have not manifested their presence in northern Europe, for the interest of the rival powers are Norway and Denmark, much more than Sweden, which constitutes the strictly Baltic front.

In case of a conflict between the U.S.S.R. and the Anglo-Saxons, the Soviets will easily be able to occupy northern Norway, which was formerly an important German submarine base, and they will be able to occupy Spitzbergen, where Russian laborers are curiously out of proportion to the productive capacity of the coal mines leased there by the Soviet Arktik Ugolz. The eastern front would thus be fixed between Spitzbergen and North Cape, with fog-bound Bear Island midway between.

In the west, the Anglo-Saxons have not remained passive. For a long time,

it has been observed that the Americans are interested in the Scandinavian possessions in the North Atlantic.

We should not forget that Greenland, an almost uninhabited country, constitutes for the western hemisphere, a first bastion of excellent jumping off points. The covetousness of Washington and Montreal is quite evident in these areas. According to Admiral Schwede, Russian naval specialist of "Pravda," the United States possesses in the Atlantic 228 bases within a radius of from ten to twelve thousand kilometers from the American Continent. Admiral Schwede concludes by claiming that the American fleet is equipped not for defense but for offensive operations.

In the minds of certain American strategists, we would quite clearly see this defense bastion extended for purposes of attack by means of islands such as Iceland, the Faroes and the Shetlands. The Faroe Islands are less than 800 kilometers from the Norwegian, and less than 990 from the Danish coasts.

It would have been thought that the United States would have organized its defense system with Greenland and Iceland, leaving Great Britain to do the same with the Shetland and Faroe Islands, but latest events show that the Americans are less interested than ever in the Faroes.

The western coasts of Norway are very close to these bases. The western powers could easily effect landings there by water or air. And the whole of southwest Nor-

way is replete with fjords and is rich in comparison with the northern portion. We find there, minerals, factories and, of particular importance, the only plant in Europe engaged in the manufacture of "heavy water," so important in connection with the atomic bomb. This plant is located at Vermork near Rjukan and belongs to the Norsk-Hydro of Notodden.

This makes twice in succession that the northern nations have been obliged to be on the alert in the defense of their countries. And we have the words of General Jung as confirmation. Sweden is doing a great deal toward her defense; in Norway, certain declarations prove that the problem is being squarely faced. As for the Danes, the most threatened at the present moment, they are assiduously upholding their rights, from the military point of view, in the Atlantic and Baltic, and are fortifying Bornholm.

As was stated by M. Gunther, Swedish Minister of Foreign Affairs, in January, 1941: "The greatest danger for a small country situated close to great and rival powers, resides in its constituting an empty space, from the military point of view. It is up to us to decide whether we shall be considered a 'no-man's-land' or a country truly able to defend its independence."

But it remains to be seen whether the pacific intentions of these small countries will be of any importance when the threatening shadows of the great colossi of the present day move in their vicinity.

How are we going to require in a future war that the armed forces act jointly, if we do not start out in peacetime to learn how to coordinate our efforts, to work in perfect harmony, and to get ourselves used to carrying out the orders of the various higher commands?

Lt. Col. Cesar Pando Eguzquiza in "Revista de las Fuerzas Armadas," Venezuela

German Flak Defenses

Digested by the MILITARY REVIEW from an article by Brigadier G. L. Appleton in "The Journal of the Royal Artillery" (Great Britain) January 1947.

It is not generally realized how great an effort was devoted to the antiaircraft defenses of the Reich. The *Luftwaffe* was principally responsible for this task, although the Navy provided antiaircraft defenses for its shore bases while the Army included antiaircraft units in its mobile field formations. From a comparatively modest establishment in peace, the flak organization of the *Luftwaffe* expanded rapidly during the war until it reached its peak in mid-1944. At that time, the force employed was one and a quarter million. This included more than a quarter million auxiliaries of various kinds, including a large number of women auxiliaries, prisoners of war and foreigners of various descriptions. The equipment operationally employed comprised some 15,000 heavy guns, 25,000 light guns, 7,000 searchlights and 2,500 balloons. This effort may be related to that of Great Britain in roughly comparable circumstances. In Germany, with a population of some seventy millions, the Germans employed in the *Luftwaffe* flak were about 1½ per cent. In the United Kingdom, with a population of about forty-five millions, approximately ½ per cent were employed in antiaircraft defenses.

The Germans were fully alive to the fact that their war effort was entirely dependent on the safety of their industries. Their first conception, therefore, was to provide an overall defense for each of the major industrial areas. As the Allied bomber effort increased, they found that it was impossible to defend every area adequately. They tended more and more to concentrate their waning resources on the defenses of the really vital targets, for example the oil refineries. An outstanding example of the latter was the Leuna area, containing nearly 600 heavy

guns. The troops manning these defenses claimed 216 aircraft shot down in the second half of 1944, while effective bomb hits on the refineries fell to a low figure.

The emphasis on weight of fire and concentration of effort over vital targets led logically to the formation of larger units which afforded economy in command and fire control personnel. The original unit of four heavy guns became a six-gun unit. This tendency continued until eight- and twelve-gun sites made their appearance, while one or two sixteen-gun sites are known. A variation was the tactical combination of two or three individual four- or six-gun sites with a common command post and fire control equipment.

Under the increasing weight of Allied air attack in 1942-43, and the pressure of shrinking resources of flak man-power and material, it was not surprising that the Germans endeavored to redress the balance by mobility. One means was a considerable mobile echelon of heavy flak weapons on railway mountings. At first sight the conception of railway flak capable of rapid movement is attractive, but the drawbacks, which caused the British to reject the idea for use in the United Kingdom, outweigh the advantages. Among the principal disadvantages are: (1) the tactical rigidity of a railway system which does not allow guns to be sited precisely where they are wanted; (2) the risks of railway tracks being cut, thus immobilizing railway guns; and (3) the vulnerability of railway guns and fire control systems which are not readily protected from bombing.

What must be regarded as major eccentricities are the flak towers of Hamburg and Berlin. These are vast concrete structures sited in pairs; one tower in each pair carried four 12.8-cm guns and

the other the fire-control instruments. The tactical value of these towers was dubious and did not warrant the immense cost of construction merely as gun platforms. They did, however, provide valuable air raid shelters and were said to be capable of accommodating 10,000 or 15,000 people each. But it is difficult to conceive how the *Luftwaffe* managed to justify the immense expenditure of labor and material.

The German employment of searchlights is of interest. At the time when the British were developing their "carpet" of searchlights all over England and southern Scotland as an aid to fighter interception, the Germans erected a great belt of searchlights for the same purpose from Holland, through Belgium to Northern France. This belt, although of considerable moral effect, rendered no great assistance to German fighter aircraft. In April 1942, when the Germans had achieved some success in providing radar control of night fighter aircraft, this belt was abandoned. The searchlights were re-deployed in the principal gun defended areas. Here they played an important role in the defenses, not only in illuminating aircraft for engagement by the guns, but also in producing the strong moral effect which bomber crews so often mentioned.

The standard service guns with which Germany began the war were the 8.8-cm heavy gun and the 2-cm light gun. Both of these were excellent of their kind. The 8.8-cm gun was comparable in performance with the British 3.7-inch gun. It came particularly into popular prominence with the British press, when it was first employed (and, incidentally in qualified German opinion, misused) as an antitank weapon in North Africa. The Germans were not content to conduct the war with these weapons alone, and introduced in smaller quantities, the 10.5-cm and 12.8-cm heavy guns together with a 3.7-cm light gun. These weapons, too, were of high technical quality. An intermediate gun,

the 5-cm was fully developed but no production capacity could be made available for its manufacture in quantity.

The Army made considerable use of the 8.8-cm flak gun as an antitank weapon and in support of ground forces. There is no doubt that this gun, as distinct from its mounting, was effective as an antitank weapon and, to a less extent, as a long range medium gun for the engagement of ground targets. The same is true of the British 3.7-inch antiaircraft gun. The sinister reputation of the 8.8-cm gun in the North African campaigns will be remembered, although the popular press, with frequent references to "nests of 8.8-cm guns" and their deadly efficiency and so on, unwittingly did much to produce an unfortunate 8.8-cm complex which was not justified. The High Command decided, however, that the 8.8-cm equipment as a whole was not suitable antitank equipment. Its carriage was not designed for the purpose. It was very exposed and only very lightly shielded. In consequence, casualties to gun detachments and equipment, when used in the forward area in support of ground troops, were excessive and unsupportable. As a result, flak units thus misused and expended were not available for the role for which they were provided, the defense of the army against air attack. Thus the High Command in 1943 strictly forbade the use of heavy flak guns in a ground role except in the gravest emergency. That this precept was often ignored during the 1944-45 campaign in the west is evident from the frequent wreckage of 8.8-cm guns, which one may see by the roadside, where they could only have been employed in a ground role. Furthermore, this was at a time when antiaircraft protection was more important than ever before. This tendency to misuse antiaircraft artillery is not peculiar to the German Army, and has been found sometimes even in the British Army. It perhaps arose in both armies from a lack of real comprehension by the staffs

of the needs of antiaircraft defense for armies in the field. This was combined with a natural desire to use all available gun power against the opposing enemy ground troops. Naturally, the propriety of diverting antiaircraft artillery from its primary role to a secondary ground role is entirely dependent on the air situation. In conditions of complete air superiority such a diversion is entirely proper and economical.

German fire control equipment was of a high order of design and workmanship. But the development of defensive equipment, such as flak, had been given a low priority in the victorious years of 1940 to 1942. As a result, at the end of the war, the Germans possessed neither electronic predictors nor radar comparable with the British GL III, much less the American SCR 584. It was not until 1943, when the results of the Anglo-American bombing offensive were becoming painfully evident, that the development of flak matériel was accorded the highest priority. The technical weakness of German radar equipment was brought into prominence at Hamburg on the night of 24-25 July 1943. This date is still an historical landmark for the inhabitants of that city who refer to events as taking place before or after "the raid." For a year prior to that date, the German night fighters, in cooperation with the flak defenses, had succeeded in inflicting serious losses on night bombers whose tactics of staggered approach over a period of long duration were well suited to the German night fighter procedure. On that night, the attackers adopted new tactics and came over in massed formations. In addition, they scattered copious quantities of the radar-jamming device known as "window," consisting of a multitude of metallic strips which drifted in clouds to earth. The radar control of the German fighters and the radar fire control apparatus were completely upset and the bombers were able to strike a shattering

blow on the great city. It was at once evident to the Germans that the ability of their flak defenses to engage the enemy with accurate unseen fire was seriously prejudiced. They were forced, henceforth, to adopt the retrograde step of relying on inaccurate and expensive barrages. The vast expenditure of ammunition occasioned thereby was to cause them serious concern as the war continued.

The experiences of 1943, and of Hamburg in particular, caused a radical change of policy. The development of flak equipment was thereupon accorded a high priority. Although the war ended before radically new matériel reached the troops, much useful work had been achieved in design and development. It was apparent to them, as it was to us, that the rapid development of speedy, high-flying and heavily armored aircraft was fast making the existing antiaircraft equipment obsolete. The first and obvious step was to improve flak guns and ammunition on orthodox lines. The majority of the new projects designed to attain increased operational ceilings and shorter times of flight were parallel to similar projects in the United Kingdom. Among the more interesting were smooth-bore guns firing fin-stabilized projectiles and super-velocity guns employing the "sabot" or sub-caliber principle. The tapered "squeeze-bore" which had already had some success in antitank weapons, was also under trial.

Some improvements in ammunition were achieved and put in the hands of the troops. Among these were: first, segmented HE shell which produced larger and harder-hitting fragments; and, second, incendiary shrapnel. The latter on bursting produced a shower of incendiary pellets, each provided with a miniature fire. These were designed primarily to penetrate fuel tanks and to cause fire. The Germans considered this shell to be a successful innovation. Several projects for "proximity" fuzes were under develop-

ment, but none of these reached the troops. None is believed to have achieved the success attained by Anglo-American projects of this nature.

The Germans considered, with justification, that successful ground action against high-flying aircraft in the future did not lie with the gun, however powerful, but that efforts must be directed towards a radically new solution. They thought that they had found this in the guided projectile. Even before the war, a large effort had been devoted to rockets and jet-propelled projectiles of various types, of which the V-1 and V-2 are familiar examples. An anti-aircraft projectile remotely controlled from the ground, and perhaps "homing" automatically on an aircraft was a logical development in this field. Several types of this nature were in a high state of development at the end of the war, the most noteworthy being those known as *Wasserfall*, *Schmetterling* and *Enzian*. The Germans hoped that with weapons such as these, and given a successful proximity fuze, they had an answer to the massed bomber raids which were causing such havoc. The progress in this field was noteworthy, and indeed some rocket designs such as that of V-2 were most distinguished achievements. None the less, success was far too late to effect the outcome of the war. The fruits of their endeavor were fated to fall into Allied hands before they could be used.

To the British anti-aircraft gunner, there is much interest in observing how the Germans were faced with technical and organizational problems which were similar to, and often identical with, those which we ourselves had to deal. From the technical aspect, German research and development in flak ran largely parallel to our own, but as has already been observed, lagged in point of time. This was not the fault of the German scientists, whose ability was of a high order. One

major reason is that a period of German offensive success covered the first two years of the war. The natural result was a tendency to devote their resources to the development of offensive rather than defensive weapons. It was not until 1943 that the possibility of a defensive war began to become apparent. The British, on the other hand, were thrown on the defensive in 1940 and 1941. In consequence, the political and service backing for intensive flak development in Great Britain was powerful and sustained, and gave us a technical lead which was maintained until the end. This, incidentally, enabled us to develop our effective anti-aircraft defense against the flying bomb. If the sequence of events had been reversed, and Great Britain had passed through an initial period of successful offensive, it is questionable whether the striking technical advances in British anti-aircraft gunnery would have been made.

A major point of interest to us is that the flak defenses of the Reich were an integral part of the Air Force and not of the Army. This is a conception which has often been suggested for the anti-aircraft defense of Great Britain. It is interesting to observe that the principal advantage claimed for such an arrangement, the integrated tactical control of fighter and flak defense, was not achieved by the Germans. The two arms were distinct and separate. Liaison procedure was usually necessary and frequent dissensions between air and flak took place. The relationship of the British Anti-aircraft Command to Fighter Command was more highly developed and satisfactory, although these two formations belonged to separate services.

The question may well be asked whether the results of the German flak effort were commensurate with the expenditure of manpower and industrial resources. That significant losses were caused to the Allied bomber force is unquestionable. There

is no doubt, too, that heavy concentrations of flak over the important industrial areas had an important effect by adding considerably to the nervous strain of operations and thereby contributing to air-crew wastage. The very heavy concentrations over a few vital targets such as Leuna, introduced in the last few months of the war, approached the borderline of completely effective antiaircraft defense. Losses could be inflicted which might be insupportable over a long period, and accurate bombing rendered difficult if not impossible. If, during the last two years of the war, the Germans had been

able or willing to pursue consistently this militarily correct policy of concentration over a comparatively few vital areas, the key industrial plants, such as the oil refineries, might well have had a longer life and the war might have been prolonged thereby. The answer to the question postulated at the beginning of this paragraph is probably in the affirmative. The Germans could have made effective use of far greater flak forces, and they made considerable efforts to find them, but the eventual shortage of man-power and industrial resources prevented their production.

To fix with greater clarity the guiding principles on the tactical employment of engineers it should be pointed out that there exists alongside the tactical battle, a technical battle, in other words, there is a technical aspect of the battle that should be secured just like the tactical aspect, for if the first one is lost the second one will also be lost, and conversely, if the first one is won there is a strong probability of winning the second. It is up to the engineers to secure the technical phase of the battle.

*General Pablo Emilio Lopez in "Memorial del
Estado Mayor," (Colombia)*

French Mediterranean Air Forces

Translated and digested by the **MILITARY REVIEW** from an article by Major de Fouquières in "Forces Aériennes Françaises" (France) February 1947.

AN account of the operations of the 1st Group of the 5th (Champagne) Wing from 3 September 1943 to 12 September 1944, gives a fairly accurate idea of the work of the Mediterranean Coastal Command which was important to the security of convoys in the Mediterranean.

After eight months of intensive training with Curtiss P-36s, the Group was reequipped 1 July 1943, with P-39 "Aircobras." The change-over of pilots, effected in an American training camp, gave rise to no difficulties. While they familiarized themselves with the handling of the planes and its guns, all pilots were instructed in Allied radio operation and familiarized with the various types of friendly and enemy planes in identification classes.

On 1 August, the Group was organized on the pattern of an American squadron: 316 officers, noncommissioned officers and men, thirty-five of them pilots, and twenty-five planes. At the same time, a ground echelon with thirty-five vehicles arrived. On 3 September, the 1st Squadron of the 5th (Champagne) Wing, proceeded to its operating base at Tafaraoui, near Oran.

This base, under English command, was already occupied by an American night pursuit squadron equipped with "Beaufighters," and an English antisubmarine patrol unit equipped with "Hudsons" and "Venturas," and a squadron of three "Walruses."

These three units operated under the orders of a wing commanded by an American lieutenant colonel. The wing, which also had at its disposal the French 3d Group of the 6th (Roussillon) Wing stationed at Lapasset, was charged with the protection of navigation between Alboran Island and Cape Ténès, a distance of more than 400 kilometers.

On the ground, four radar and two radio stations, one at Oran and the other at Cape Ivi maintained watch over the skies and command of the patrols.

The principal task of the group was to assure constant protection to convoys from a half hour before dawn till a half hour after sunset. The cover was usually provided by two planes except in the morning and evening when the number of planes was increased to four. In addition, it was necessary to cover the port of Oran at dawn and sundown when convoys put into port there.

The feature that most interested the pilots, at least at the beginning, was the alerts. A patrol had to be ready to take off in less than three minutes. Two others had to be ready, one in a quarter and the other in a half hour's time.

During September, the Germans, fearing a landing operation in southern France, very frequently sent out reconnaissance planes and, on 13 September a patrol intercepted a Junkers 88 and brought it down in flames. This easy victory was followed by many alerts or "scrambles," but interceptions were rare.

These failures had two causes: erroneous estimate of the altitude of the enemy planes, and the fact that the P-39s were not able to engage the Ju-88s which came over at very high altitudes. On the afternoon of 4 October, however, during an attack on a convoy off Lapasset, the 4th Group of the 6th (Roussillon) Wing won four victories.

The German practice at that time was as follows: Informed by their agents of the passage of convoys at Gibraltar, the Germans followed the convoys with their reconnaissance planes and attacked at nightfall. The attacks always occurred between Mostaganem and Cape Ténès, be-

cause this zone is closest to the French coast and was poorly covered by radar, since it was at the limit of the Algiers and Oran sectors.

The 3d Group of the 6th (Roussillon) Wing later found itself in serious difficulties due to overheating of the motors of the P-39s, and was declared non-operational for a time. The Champagne Group's task thus increased, since it had to cover a larger sector which extended to Cape Ténès.

The pilots and mechanics were heavily taxed, some pilots putting in seven hours of flying time plus two hours of "readiness" per day. Still, the results obtained were not all that could be desired, even though the number of enemy reconnaissance planes decreased on 11 November, an attack on a convoy showed that the system of protection being employed was defective.

All that day the group had protected a large convoy, which arrived off Mostaganem at nightfall. Since a German reconnaissance plane been seen during the day, it was certain that the convoy had been spotted, and the command had taken precautions for the night. The convoy was to be protected by three light patrols flying at 2,000, 4,000 and 6,000 feet.

A half hour after sunset, when the six protecting planes, almost out of gasoline, were preparing to return to base, a red ball moving across the sky, attracted the attention of one of the pilots. It was followed by two, then three, then four others. The convoy was being attacked by new radio-controlled flying bombs and the radar had not given notice of the approach of the planes. The flying bombs did not strike their targets, but a wave of torpedo planes caused great destruction, and the crews of the pursuit planes could only watch the pyrotechnic display of anti-aircraft artillery, the explosion of an ammunition ship, and a tanker on fire.

In night flights before dawn, we some-

times descended almost to the surface of the water in guarding the convoys, when the pilots could scarcely distinguish even the tops of the masts. The only reward was the discovery of a German submarine which was attacked and forced to surface and surrender.

The command took measures for reducing the number of flights, somewhat, and for transforming our passive defense into active defense by searching for the enemy.

The first measure was the establishment of "sweep" zones. These zones, situated in the areas about the convoys, were explored on order by a patrol which was to fly as low as possible in order to discover possible enemy planes flying too low to be detected by radar.

The mission of covering the port of Oran disappeared completely, but the alert from dawn to dark was reinforced and stepped up to three patrols on three-minute alert status. At nightfall, the convoys halted and laid down a protective smoke screen.

The total application of these new methods of operation coincided with the end of the year and the transfer of the Group to La Senia. In four months, the Group had effected 4,012 hours of flying in 2,664 sorties without loss.

In the period which opened with the new year, training and instruction were resumed. This was possible as a result of measures which lightened the load imposed by the operational flights.

The first concern of the command had been to get the signal and detecting systems into perfect order, particularly, the system of calculation of altitude by radar.

After 11 November, the Germans did not attack convoys in the Oran zone, but transferred their efforts to the Algiers and Bône areas. These attacks confirmed the failure of the flying bomb, and the German High Command, dissatisfied with results, changed the commander of the fleet in this sector. We knew that the new

commander planned night attacks, but we did not know until later that the Ju-88s charged with day reconnaissance were not only to ascertain the speed of the convoys, but were to drop a buoy containing radio signalling apparatus on the spot where it was calculated the convoy would be at the hour of the attack, to guide the night expedition.

In the meantime, special measures were taken to intercept reconnaissance flights attacking formations. This mission consisted of despatching all available planes before sunset on patrol close to the surface of the water and as far out to sea as possible. In order that radio contact might not be lost and localization by radar might be possible, one patrol was to remain above the other at a height of 3,000 feet. At the same time, patrols of "Beaufighters" cruised in the same manner, opposite the Balearic Islands.

These missions were particularly difficult, for they required continual attention, to the water and to the almost invisible neighboring plane, all the time maintaining watch over the sky.

Reward for these efforts came quickly, however. An attack planned for 1 February on a convoy which was passing off Ténès, failed completely. The loss of a reconnaissance plane prevented the German bombers from finding the convoy and they were intercepted by the night fighters which chalked up a fine victory.

During this period, the Oran sector remained fairly quiet. On 23 February, a patrol engaged a Ju-88 which escaped in the clouds. The group learned the following day, however, that the Ju-88, badly damaged, had made a belly landing at Saint-Martin-de Grau with a wounded man on board.

The English espionage network, based on the resistance organizations, functioned marvelously, and the wing commander was often informed immediately of the de-

parture of German planes from French territory.

Thanks to these innovations, it became possible by the end of January to do away with a *a priori* protection of convoys, and the group was better able to devote its time to instruction and training.

The experience and ability of the command was felt in all fields, but was brought out especially in the admirable "Air Sea Rescue" organization. From the beginning of operations over the sea, all pilots had been warned that they must never attempt to land on the water with an "Airacobra," but that they must bail out. During the first few months the sole protection possessed by the pilots was the "Mae West" life-jacket. At the beginning of December, each pilot received a pneumatic raft or dinghy.

The month of March brought back the German high altitude reconnaissance missions. A Ju-88 flew over and was spotted by two P-39s, but they were unable to intercept. The English command asked that a patrol of Spitfires be detached to Oran for these high altitude interceptions. This patrol, which was to remedy the only defect in the set-up, arrived in May.

The attacks on convoys continued to be unsuccessful, however. On 8 March, a Ju-88 was brought down by the Navarre Group, based at Algiers. On 18 March, the leader of a dawn patrol sighted a Ju-88 above a convoy and it was immediately brought down.

Shortly after this, on 10 April, a Ju-188, a new model German reconnaissance plane, was brought down off the coast of Spain in a "scramble." The next day a light patrol brought down a Ju-88 which had just reached the Algerian coast. This "double" closed the list of air victories. German activity continued to diminish in proportion to the increasing perfection of our defense organization.

By the end of April, our forces over

the whole of North Africa were greatly reduced. The 3d Group of the 6th (Roussillon) Wing left Lepasset, and was replaced by a squadron of Group 1 of the 5th (Champagne) Wing. Many convoys now passed through with greatly reduced protection. The "scrambles" became rare, and were generally caused by friendly planes which had forgotten their identification signals.

German planes very rarely appeared, but on 11 August a Ju-88 was pursued into Spanish territory. The fight was broken off when the pilot perceived

that he was violating Spanish neutrality.

On 25 August, following the landing in Southern France, the group was declared non-operational, and the Allied Coastal Air Force was dissolved.

During the last year of its operation, the activities of the group may be summed up as follows: 11,516 hours of flight comprising 5,091 operations in 3,052 missions; four planes brought down, two planes damaged, three pilots killed on operational missions. Of the pilots attached to the group since the beginning, all had flown some one hundred missions.

In the case of ancient armies with their archaic ideology . . . there can be no doubt or difficulty of any sort. The soldier is not a citizen, but an essentially obedient and passive instrument that moves, attacks, destroys and kills, unconsciously, without responsibility, at the investigation of others who hold power despotically, thus violating the natural law.

But throughout the centuries, a completely different mentality has evolved. The modern soldier conscientiously recognizes the existence of human rights, the responsibility of the individual towards the national collectivity, the respect of the laws and the constitution. The military profession at present does not absorb the conscience of the soldier to the point of eliminating his fundamental rights as a citizen. The soldier of today is, above everything, a person; this person is also a citizen, and this citizen is finally a soldier that has nobly placed all his energies at the disposition of his country.

Fernando Lera in "Orientación" (Uruguay)

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